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No. 2351.—VOL. L. LONDON, SATURDAY, SEPTEMBER 11, 1880. PRICE (WITH THE JOURNAL) SIXPENCE. PER ANNUM, BY POST, £1 4s.

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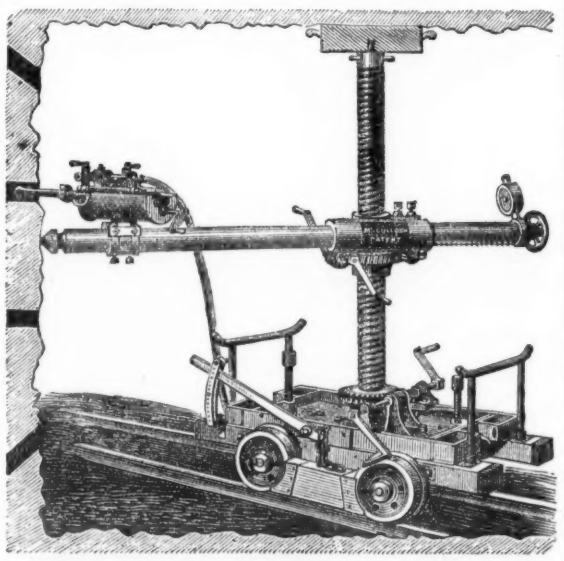

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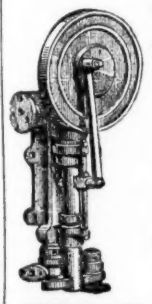

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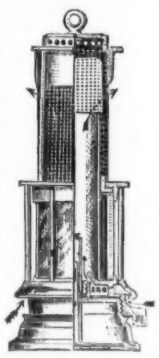

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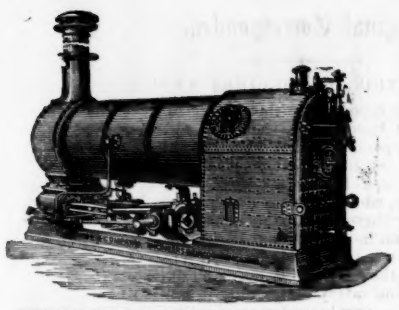

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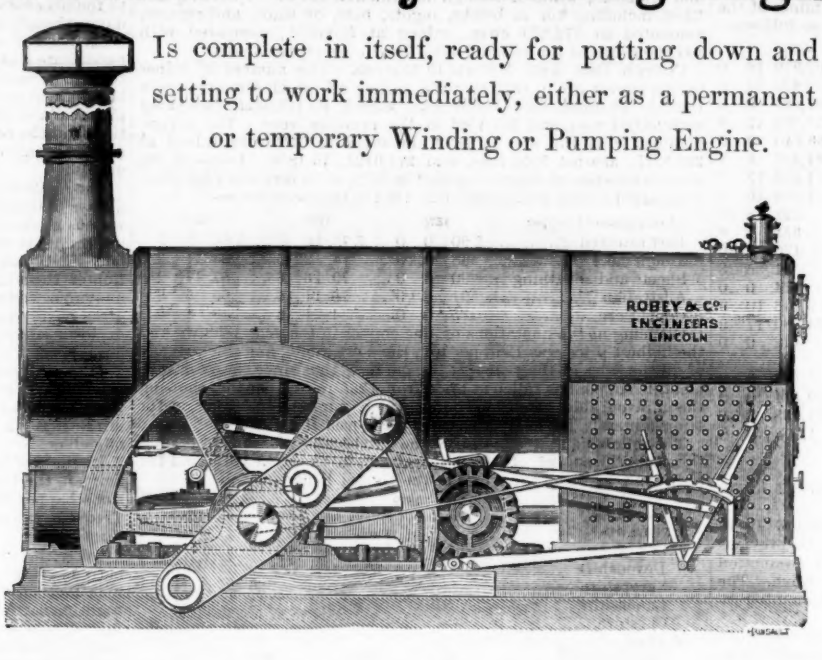

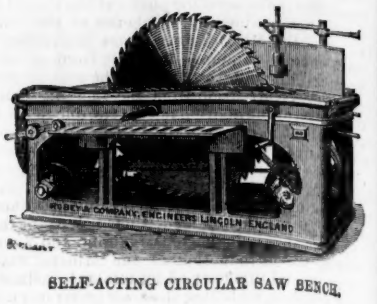

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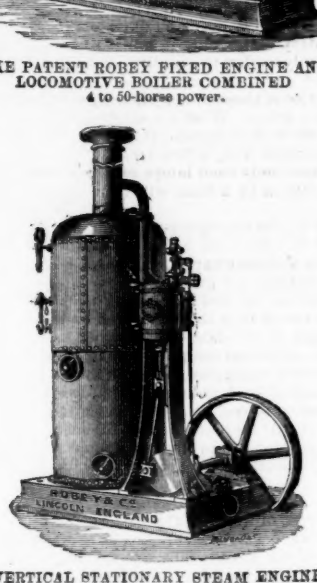

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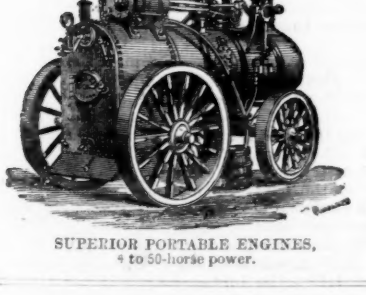

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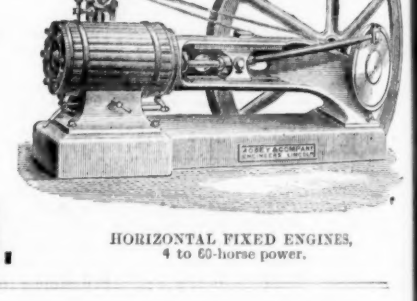

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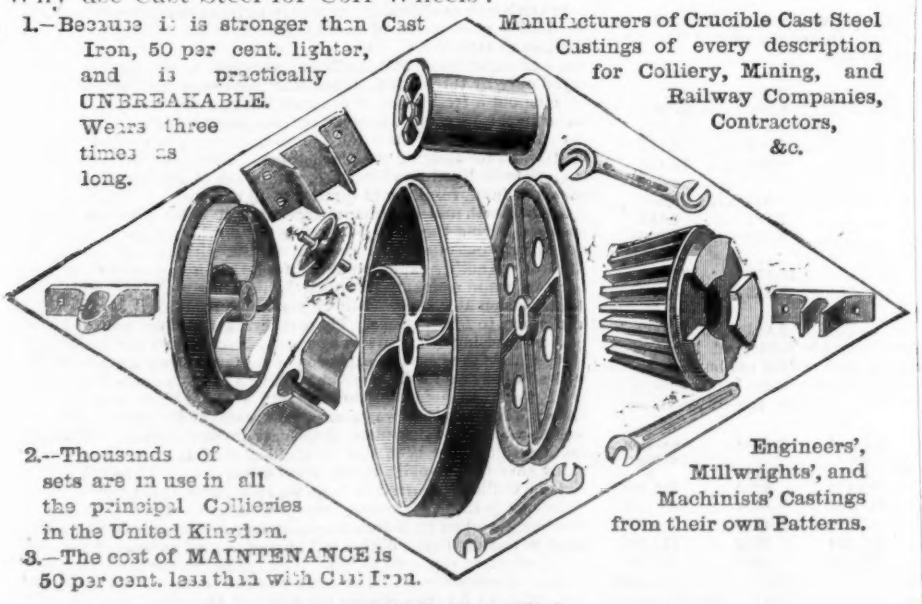

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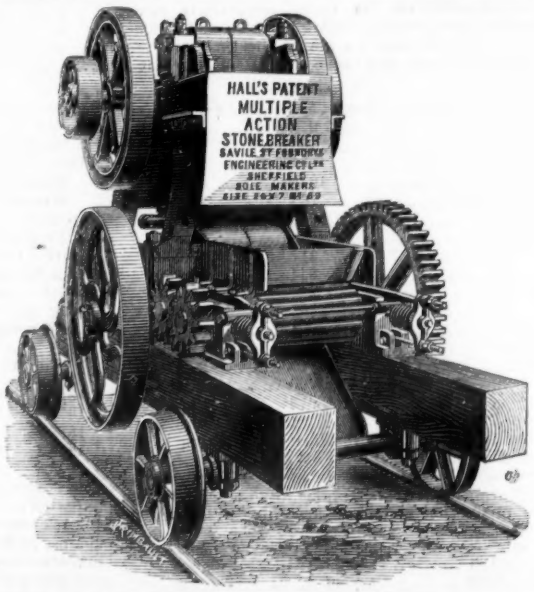

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MINERAL STATISTICS OF THE UNITED KINGDOM FOR THE YEAR 1879.—No. I.

A few weeks since very complete extracts appeared in our columns giving detailed information of the coal and metalliferous mines of the United Kingdom and their production, these, however, though instructive and interesting to all connected with our numerous mineral and mining industries, do not fully represent commercially the magnitude of the mineral industries of the United Kingdom, inasmuch as the returns obtained by the clauses of the Coal Mines Regulation Act and of the Metalliferous Mines Regulation Act alone include returns of crude minerals obtained from mines under inspection. Numerous districts in the country, the seat of important mining industries, escape attention from the fact of their not coming within the operation of the above-named Acts, due to the fact that operations are carried out in open workings; while, on the other hand, the Acts above referred to embrace only mines or explorations underground.

From the volume now before us we are enabled to place before our readers, at a somewhat earlier period than in previous years, the production of our coal and metalliferous mines, the value of the minerals, the metals obtained, their value, and a variety of general information alike valuable to the mining and commercial community Following the introduction of the Mineral Statistics for the past year, the general summary of the mineral produce of the mines of the United Kingdom, including those *not* under inspection, is as follows—

Minerals.	Quantities.	Value.
Coal ..... Tons	134,008,228 0 ...	£ 46,902,879 16 0
Iron ore	14,379,735 0 ...	4,962,434 14 0
Tin ore	14,665 3 ...	586,608 0 0
Copper ore	51,032 0 ...	177,382 15 6
Lead ore	66,877 9 ...	688,740 0 0
Zinc ore	22,199 19 ...	81,531 3 9
Iron pyrites	20,275 11 ...	11,835 13 3
Manganese	816 8 ...	1,515 10 0
Silver ore	27 19 ...	621 18 11
Cobalt and nickel ore	116 11 ...	833 2 5
Wolfram	13 0 ...	120 8 10
Uranium (Pitchblende)	0 5 ...	41 5 8
Bismuth	0 1 ...	14 0 0
Ochre and umber	3,973 12 ...	3,436 10 9
Arsenic	5,492 10 ...	34,180 17 9
Fluor spar and dross	1,264 16 ...	422 0 0
Clays (porcelain, and potters' and fire-clay)	2,878,489 0 ...	717,143 0 0
Salt	2,558,368 0 ...	1,279,184 0 0
Barytes	19,349 18 ...	21,068 3 0
Jet	3 0 ...	1,000 0 0
Sundry minerals — including shales, gypsum, calc spar, coprolites, and phosphates, &c.	525,950 0 ...	262,975 0 0
Total value of minerals produced in 1879		£ 55,733,967 19 10

These totals compare favourably with the returns of the previous year, inasmuch as in many of the items a diminished production appears, compensated on the other hand by increased value. The total value of minerals produced in the year 1878 amounted to 56,264,495*l.*, and in the year 1877 to 58,398,071*l.*

The metallurgical works in the kingdom produced from the above ores, in the year 1879, metals in the quantities enumerated below, with their respective values—

Metals.	Quantities.	Value.
Gold ..... Ozs.	447 ..... £	1,790
Pig-iron ..... Tons	5,995,337	14,988,342
Tin	9,532	689,163
Copper	3,462	222,507
Lead	51,635	765,489
Zinc	5,554	95,806
Silver from lead ..... Ozs.	333,674	70,906
Silver from ore	3,000	620
Other metals	—	1,000
Total value of metals produced in 1879		£ 16,835,623

Comparing these totals with those of previous years the values in 1878 amounted to 18,283,124*l.*, and in 1877 to 18,742,960*l.*

The total value of minerals and metals obtained from the mines of the United Kingdom in the year 1879 stands thus—side by side appears the corresponding figures for the previous year—

	1879.	1878.
Metals	£ 16,835,623	£ 18,283,124
Coal	46,902,879	46,412,753
Minerals not reduced—salt, clays, &c..	2,333,769	2,643,404
Total value	£ 66,072,271	£ 67,339,281

We shall now proceed to note the returns of production, taking the metalliferous minerals in the order in which they appear in the volume before us.

TIN.—During the year 1879 there appears to have been 85 mines producing tin ore, of these 80 were in Cornwall and 5 in Devonshire. The black tin produced amounted to 14,280 tons, the value to 562,530*l.*; the (white) metallic tin obtained from the ore was 9282 tons, of the estimated value of 671,722*l.* Another source of information on the production of this important metal appears in the Returns of the Tin Smelters, who in the year 1879 purchased 14,665 tons of black tin, yielding 9532 tons of metallic tin, the values respectively being, according to the average prices ruling during the year, as 586,608*l.*, and 689,163*l.* The annexed table notes a few of the tin mines producing upwards of 250 tons of ore, and exceeding 10,000*l.* in value—

Mines.	Quantities.	Value.
Botallack ..... Tons	501 ..... £	20,355
Levant	273	10,944
Wheal Sisters	569	21,411
West Wheal Basset	1000	38,169
Carn Brea	1048	41,910
South Condurrow	762	31,372
Dolcoath	1780	71,216
South Wheal Frances	728	28,953
West Wheal Frances	317	12,990
Wheal Jane	344	13,760
Wheal Kitty	270	12,157
Wheal Peevor	563	22,534
East Pool	864	36,033
West Wheal Seton	299	12,099
Tincroft	510	20,418
Wheal Uny	290	11,488
Eliza Consols	615	25,923
Phœnix and West Phœnix United	564	22,520

The five mines producing tin ore in Devonshire contributing to the total 32 tons, of the value of 1068*l.*

The number of mines selling tin ore (black tin) in Cornwall and Devon in 1879 and four previous years were as follows—side by side appears the annual production and value, according to the returns of the smelters—

Years.	Number of mines.	Tin ore—tons.	Value—£.
1875	183	13,995	735,606
1876	185	13,688	600,923
1877	98	14,142	572,763
1878	90	15,045	530,737
1879	85	14,665	586,608

Prices of tin ore and of metallic tin show considerable fluctuations during the above years, the former falling from 52*l.* 11s. 8d. per ton in 1875 to 35*l.* 5s. 6d. in 1878, and with the partial revival of trade in 1879 rising to 40*l.* per ton. Metallic tin in the same way receded from 90*l.* 2s. per ton in 1875 to 65*l.* 12s. 3d. per ton in 1878, and advanced during the past year to 72*l.* 6s. per ton. The average prices during the past five years of the ore and metal being quoted as under—

Year.	Tin ore per ton.	Metallic tin per ton.
1875	£ 52 11 6	£ 90 2 0
1876	43 18 0	79 10 2
1877	40 10 0	73 3 6
1878	35 5 6	65 12 3
1879	40 0 0	72 6 0

The above prices of metallic tin per ton in each of the same years represents the following values of the metal produced, which appears side by side—

Year.	Metallic tin.	Value.
1875	Tons 9,614	£ 866,266
1876	8,500	675,750
1877	9,500	695,162
1878	10,106	663,080
1879	9,532	689,163

IMPORTS AND EXPORTS OF TIN.—The total quantity of tin ore imported in 1879 amounted to 306 tons, and of tin—blocks, ingots, bars, and regulus—16,763 tons; the corresponding imports in the previous year being 567 tons and 16,644 tons. Of the tin imported in the past year New South Wales contributed 4695 tons, Victoria 2129 tons, Tasmania 1159 tons, and the Straits Settlements 7260 tons.

The sales of Billiton tin in Batavia in 1879 amounted to 76,000 piculs, compared with 62,000 piculs in 1878, and 60,000 piculs in 1877. The Banca tin delivered in Holland in 1879 amounted to 136,110 slabs, compared with 106,276 slabs in 1878, and 131,695 slabs in 1877. The sales of Banca tin in Holland by the Dutch Trading Company in 1879 amounted to 136,110 slabs—1000 slabs weighing about 32 tons.

The exports of British tin in 1879 amounted to 124,353 cwts., against 124,483 cwts. the previous year, the respective values being 448,483*l.* and 413,253*l.*; while of foreign and colonial tin the exported quantities, including tin in blocks, ingots, bars, or slabs, and regulus, amounted to 176,873 cwts., valued at 620,679*l.*, compared with 131,800 cwts., of the value of 417,370*l.*, in the previous year.

COPPER ORE AND METALLIC COPPER.—The number of mines selling copper ore in 1879 shows a falling off, which also appears in the ore: 65 mines sold 51,032 tons, valued at 177,382*l.*, compared with 56,094 tons, and 201,434*l.* in the previous year. The copper obtained from the ores in 1879 amounted to 3462 tons, valued at 222,507*l.*, against 3952 tons, and 271,042*l.*, in 1878. Prices of the several varieties of copper declined in 1879, as in previous years, this is apparent in the quotations given for the following years—

Description of copper.	1875.	1877.	1879.
Best selected	£ 90 0 0 ...	£ 75 16 0 ...	£ 64 5 6
Tough cake	88 9 0 ...	74 12 6 ...	63 1 3
Sheets and sheathing ...	90 8 0 ...	79 16 6 ...	67 17 9
Australian	91 6 0 ...	75 11 6 ...	65 5 6
Copper ore	5 0 0 ...	4 4 6 ...	3 8 6

Glancing at the quotations of fine copper in the year 1858 we find the highest price was 126*l.* per ton, the lowest 98*l.*, and the average of all the sales of the year 108*l.* 2s. per ton; thus since the year 1858 metallic copper has fallen in price from 126*l.* to 64*l.* per ton, showing the unfavourable conditions under which mining for copper, as for other minerals, have laboured during the past few years.

The following statement gives the production of copper ore, and the metallic copper obtained therefrom, in the year 1879, and the previous year, from the mines of the United Kingdom—

Counties.	1879. Ore. Tons.	1879. Copper. Tons.	1878. Ore. Tons.	1878. Copper. Tons.
ENGLAND				
Cornwall	30,371 ...	2315	36,871 ...	2903
Devonshire	12,736 ...	673	12,648 ...	623
Shropshire	— ...	—	325 ...	4
Lancashire	105 ...	8	144 ...	12
Cheshire	— ...	—	— ...	—
WALES—				
Cardiganshire	474 ...	49	306 ...	32
Carnarvonshire	559 ...	60	809 ...	92
Denbighshire	— ...	—	— ...	—
Montgomeryshire	7 ...	14 cwts.	33 ...	3
Anglesea	3,331 ...	118	2,155 ...	103
Merionethshire	— ...	—	1 ...	2 cwts.
Isle of Man	— ...	—	30 ...	12 cwts.
Ireland	2,096 ...	179	1,821 ...	140
Scotland	1,270 ...	50	708 ...	25
Regulus, &c.	83 ...	8	243 ...	15
Total of United Kingdom.	51,032 ...	3461	56,094 ...	3952

These quantities refer exclusively to the mines of the United Kingdom. Beyond the above there were produced and sold of British, foreign, and colonial copper ores at Swansea (where the ores were smelted), the following quantities of ore and copper obtained therefrom in the year 1879—

Where produced and sold.	Ore. Tons.	Copper. Tons.
Total copper ore produce of United Kingdom.	51,035 ...	3,462
Colonial and foreign ores, regulus and precipitate, sold at Swansea	23,333 ...	2,375
Colonial and foreign ores not sold at Ticketings	64,491 ...	12,898
Burnt ore from pyrites producing copper	481,392 ...	14,158
Precipitate copper and regulus imported	46,152 ...	21,653
Total	666,403 ...	54,546

In the previous year the corresponding figures were respectively 792,425 tons of copper ore, regulus, &c., and 61,994 tons of metallic copper, showing a falling off in the ore of 126,022 tons, and in the copper of 7448 tons.

During the year 1879 the following were some of the more important mines selling copper ore in the United Kingdom. The quantities and value of ore appear side by side—

Mines.	Ore. Tons.	Value. £.
Cornwall—		
South Caradon	6,000	27,901
Mellanear	6,471	20,433
West Tolgus	3,028	16,182
Marke Valley	3,292	10,413
Glasgow Caradon	2,176	8,267
Gunnislake (Clitters)	1,915	6,562
East Pool	2,282	4,483
West Wheal Seton	1,329	5,300
Devonshire—		
Devon Great Consols	10,156	22,329
Wheal Crebor	1,185	4,483
Ireland—		
Berehaven	1,691	10,002

During the past five years a considerable falling off appears not only in the number of mines raising and selling ore but also in the production of copper; the following are the returns for the five years ending 1879, for the United Kingdom, with the respective values of ore and metallic copper—

Year.	Number of mines.	Copper ore. Tons.	Value of ore. £.	Copper. Tons.	Value of copper. £.
1875 ...	100	71,528	333,414	4323	388,984
1876 ...	101	79,252	417,186	4694	392,300
1877 ...	101	73,141	262,270	4486	340,067
1878 ...	85	56,094	201,434	3952	271,042
1879 ...	65	51,032	177,383	3462	222,507

IMPORTS AND EXPORTS OF COPPER.—Of the various forms of copper imported in the year 1879 copper ore amounted to 87,824 tons, against 103,169 tons in the previous year. Regulus amounted to 46,152 tons, against 33,488 tons in the previous year; old copper, fit only for remanufacture, 2866 tons, compared with 3293 tons; copper unwrought and part wrought, 46,882 tons, against 39,609 tons; and copper manufactures imported in 1879 had a value of 45,763*l.*, compared with 12,631*l.* in the year 1878.

The total exports of British copper in 1879, of copper unwrought in bricks and pigs, amounted to 16,760 tons, against 17,404 tons in the previous year; mixed or yellow metal, 16,732 tons, against 14,417 tons; wrought copper of other sorts, 15,108 tons, against 12,617 tons. The total of British copper exported in 1879, exclusive of ore, amounted to 43,676 tons, against 44,438 tons in the previous year.

The total value of copper exports in 1879, amounting to 3,071,300*l.*, compared with 3,096,836*l.* in the year 1878.

Of the copper ore imported in 1879, Newfoundland supplied 24,908 tons; our possessions in South Africa, 13,629; Venezuela, 10,769; Italy, 7898; Portugal Azores, 5862; Algeria, 3444; Mexico, 3549; Bolivia, 3465; and Peru, 3264 tons. Of the regulus of copper Spain furnished 19,522 tons; Chili, 15,717; Portugal Azores, 5976; Bolivia, 2392 tons. Of copper unwrought and part wrought Chili furnished 33,805 tons; and our remote colonies as follows—South Australia, 3348 tons; Victoria, 1028; and Queensland, 5123 tons.

Of the foreign and colonial copper exported in 1879 wrought and part wrought formed the bulk, amounting to 17,817 tons. Of this France received 4533 tons; British India, 3531; Holland, 2411; Germany, 3366; Belgium, 2444; and Russia, 1074 tons.

Original Correspondence.

THE PREVENTION OF COLLIERY EXPLOSIONS.

SIR,—Readers of the reports furnished by the Inspectors of Mines for the year 1879 must have been struck with the number of explosions said to have happened from sudden and unexpected issues of fire-damp, greater or less in quantity. When gas is given off regularly in the working of coal the evolution can be safely dealt with by ventilating every place, and providing a sufficient quantity of air to dilute the gas. Under these circumstances fire-damp should never be seen. But when sudden issues of gas take place another line of action must be taken to ward off accidents. The common use of open lights in mines where these accidents occurred during 1879 point to to the necessity of using safety-lamps only in mines producing fire-damp, though it may be in only moderate quantity; and the frequent occurrence of a discharge of gas accompanying a fall of roof must necessitate a change of practice in these mines where open lights continue to be used The question arises—What is a safety-lamp? Many lamps are so designated, but we trust an investigation of the subject by practical and scientific authorities will, before long, settle the question, and the result will be that only such lamps as are proved to be safe under all ordinary conditions of a mine will be permitted to be used.

The method of procedure in the management of mines cannot be always uniform, much must be left to the judgment of the officers of various grades in the mine as difficulties arise; but we do recommend uniformity in the mode of lighting all gaseous mines; that in these only safety-lamps duly authorised should be used, and the construction of them should be entrusted only to certificated makers. The numerous cases of explosions of fire-damp that have already been given have, to a great extent, answered the question—How do colliery explosions happen? and we trust when the causes of these accidents have been so clearly ascertained and pointed out the mining community will not suffer the matter to rest until effectual remedies have been applied as preventatives. If there still remain offending parties who neglect to use proper precautions in the management of their mines it is but right that punishment should be inflicted on such offenders.

In the district including Monmouthshire, Somerset, part of Glamorgan, the Bristol and Forest of Dean coal fields, two fatal explosions happened in 1879. One occurred at Bedwelty Colliery, near Tredegar, causing the loss of six lives. This exemplifies what we have been endeavouring to direct attention to—the necessity of prohibiting the use of open lights in gaseous mines. The explosion occurred at seven p.m., after the day men had ceased to work. The fireman had examined all working places, and reporting them safe, the night men entered to their work. The result was the explosion. A fall of roof accompanied with an issue of gas supposed to be the cause, This must have taken place soon after the fireman had gone round the places, and exploded at the open lights which the workmen used. This is so continually occurring that we trust sufficient reasons have been given for causing a change in the mode of lighting to be adopted.

Another explosion happened at Wain Llwyd Colliery, the Ebbw Vale Company's property. This was the result of unskilful arrangements for ventilating the mine; at one part of the mine, about midway between the pit and working places only one door formed the separation of the in-take air from the return. From some cause unknown this door had been left open on a Saturday night, thus laying the workings beyond dead as to circulation of air. When the deputy or fireman entered the pit on the next Monday morning to examine the places previous to the workmen proceeding to work in them, he found this door open and at once shut it. The result was that the air began to clear away the gas which had accumulated since Saturday night; the explosive mixture was not long in reaching the furnace, at which it exploded, killing the furnace-man and two horse-keepers. Though the primary cause of the explosion was the placing one door in this situation, which was liable at any time to be left open (when two doors constructed so as to close of themselves, and a canvass sheet besides, should have been placed to give a sufficient protection) the act of the fireman in closing the door directly showed a want of judgment. Had he first taken measures to put out the furnace and all lights in the pit the catastrophe would in all probability have been avoided. The use of the furnace as an agent to create ventilation is certainly a weak point, more especially in mines emitting fire-damp unexpectedly. The time is not far distant, we trust, when mechanical ventilators will be adopted, as they are found to be so much superior in safety and economy.

In the North Staffordshire district, which has been already referred to, details were given of the Lycett explosion, which occasioned the loss of eight lives. This was clearly made out to be owing to want of supervision and inefficient ventilation, the air being conveyed only by three 12-in. pipes into important leading places for opening out a fresh seam, which gave out gas very freely. The manager in this case was convicted on two charges—first, in neglecting daily supervision of the mine; second, in not providing adequate ventilation for clearing the place of gas. There were two other fatal explosions in North Staffordshire, with a loss of one life at each, and nine non-fatal, resulting in injuries to 13 persons.

In the North and East Lancashire district three fatal explosions occurred during the year 1879. One at Rowley Colliery, from an issue of gas out of a goaf coming in contact with an open light; one life lost. Another explosion at Bedford Colliery arose from an outburst of gas in a sinking pit, open lights being used; two lives lost. An explosion at Kersley Colliery resulted in the loss of seven lives, and injury to four persons. There occurred also seven non-fatal explosions, causing injury to seven persons. Naked lights were used in all these places, the cause of explosion being respectively an issue of gas with a fall of coal; issue of gas on striking a fault; an issue from drill-hole; workman going wrongfully into a place where gas had collected. The last case was clearly a breach of the general rule, as well as a breach of discipline on the part of the workman. The other cases seem to have been due to accidental causes, and would probably have been avoided by the use of safety-lamps. The explosion at Kersley Colliery occurred on Sept. 24, 1879, in the Plodder Mine. This mine is only slightly gaseous, and open lights were in use. The coal was being worked back from the boundary in the usual manner practiced in this district. With a fall of roof in goaf an issue of gas took place, which is supposed to have been ignited at the first open light it came in contact with. The quantity of air in circulation was small, just sufficient for the ordinary condition of the mine, but not sufficient to dilute any extraordinary emission of gas as on this occasion. The general use of safety-lamps where there is any probability of a sudden emission of gas, does seem a safeguard that should always be adopted to prevent such accidents, and in all the cases above referred to explosions would most likely have been averted had lamps been used, supposing at the same time that there had been an adequate circulation of air.

In the South Durham district only four slight explosions of gas occurred, resulting in injury to four persons, but not of a serious nature. These accidents occurred in mines which were not classed as fiery ones, and where candles were generally used for lighting; it is a question in these cases whether lamps should not have been adopted to provide for any unexpected evolution of fire-damp, as probably happened in some or all of the instances named.

Only one fatal accident from explosion occurred in the Northumberland, Cumberland, and North Durham district last year. This happened to a man who entered an abandoned place with his naked light in which a small quantity of gas had collected. The place was "fenced off" by being almost closed with debris at the entrance. This was considered by the agent as a sufficient fence for the place,

though some doubt was entertained as to whether it was so or not. A more workmanlike way of making the place safe would have been to produce a circulation of air through it. There were 17 non-fatal explosions in this district, resulting in injury to 20 persons, most of whom were only slightly burnt. These causes were found to have occurred either from carelessness or from want of judgment on the part of the workmen. Three of these explosions occurred in the month of March, and three in the month of September. One explosion happened in a mine supposed to be entirely free from gas. The deputy instead of making the usual examination of the working places in the morning with a lamp, as was his custom, used a naked light, and as gas happened to be in the place it exploded, and he was burnt, but not seriously injured.

In the Yorkshire district particulars have already been given of the explosion at Fitzwilliam Main Colliery, resulting in the loss of five lives, and another at Stanley Colliery, near Wakefield, with a loss of 21 lives. The first was supposed to have been occasioned by an outburst of gas from a thin seam a few yards above the seam worked, as no gas had ever been seen before in the latter; this outburst being consequent on a fall of the roof. Open lights being used the gas liberated was ignited at the first light, and caused the explosion. The explosion at Fitzwilliam Main was occasioned in a similar way—an issue of gas from a large goaf in the Silkstone seam; this seam produces gas freely, and as several open lights were used at the time the gas was ignited by this means, producing the lamentable loss of life as stated. Neither of the explosions seem to have been occasioned by short firing, and in all probability had safety-lamps been in use these explosions would not have occurred.

M. E.

HOW MINERS WORK IN AMERICA.

SIR,—The statement made by Mr. John Rule at the West Seton meeting, the report of which has just reached us, is so far from truthful and so obviously unfair that I trust you will let the correction have as wide a circulation as the falsehoods. Miners must everywhere work and keep sober if they wish to succeed; but a miner with the same amount of industry and sobriety can become independent in Nevada much more quickly than in Cornwall. Mr. Rule stated: "Some years ago I went to Nevada, and if any fellow wants to know what hard work is there is the place to go. It is true we earned capital wages of $4 (16s.) a day, equal to 24*l.* 16s. per man per month, but to do so we had to work under so many slave-drivers, and to work like slaves. We had to work 10 long hours every day, and Sundays and Mondays all alike, for there is no Sabbath there kept holy—we had to work on Sundays the same as on week days. All sorts of hardships and privations had to be endured, and the great want of water is one of the greatest. All our allowance of water for everything was one pint per day—drinking, washing, cooking, &c.—no more to be had. You, in Cornwall, who have such an abundant supply of pure water, cannot understand what we had to put up with for the want of a sufficient supply. If you cease working for a moment the 'bosses' (overseers, captains, or slave-drivers) sing out in a way not to be misunderstood, 'Keep that hammer going.' Of course, $4 or 16s. a day are very high wages, but let me tell you that if a man is getting fair wages at home he had better remain at home, for it almost amounts to selling your life for a few dollars to endure what I did there. There are no humanising influences in such places—wretched cooking, great exposure, hardships innumerable. I believe, upon my soul, that if men were to work in Cornwall as hard as they work abroad, and be paid at the same rate they are paid at present, they would earn 7*l.* or 8*l.* per man per month. In Nevada it costs to live from 6*l.* to 7*l.* a month, everything there being exceedingly dear. The scarcity of water can be well understood when I tell you that during the whole time I was in Nevada—seven years—we had only rain three times that would sink into the ground as deep as your ankle. If you do not like your work you can leave it. You can be discharged at an hour's notice, and there are plenty of hands there to take your place."

The writer is practically acquainted with the amount of work performed by miners both in Cornwall and in Nevada. In Cornwall miners work harder, and are much more like "slaves," than they are in Nevada; miners in Nevada will not stand tyrannical treatment. In the mining camps personally known to the writer where John Rule worked—Eureka and Cherry Creek—there are neither slaves or slave-drivers, and no very great scarcity of water; in fact, those camps are as well supplied with water as Camborne was before the introduction of waterworks. John Rule says that if miners worked so hard in Cornwall as they work in Nevada they could earn 7*l.* or 8*l.* a month. I think he must work quite as hard in Cornwall as he worked in the camps named to earn even half the sum he has named, excluding Sundays.

Although Mr. Rule's misstatements cannot but cause a little annoyance, but this quickly gives place to the feeling that it will be refreshing news to the large body of miners employed in the various mining camps of Nevada, a large percentage of which is composed of British and Irish miners. And it is safe to assert that the major part of the British miners, at least, came to this country by the advice of friends already here, or that they were allured hither by the large pay and the general good treatment that miners received. Mining, under similar conditions, is alike the world over; and if a difference for the better exists anywhere it is certainly in the United States. Else why have so many Cornish miners congregated in our mining camps, especially in those of Nevada? It was simply because of the large wages, the relatively easy work, and the fair treatment. We do not believe that any capable or faithful miner, who did his work as well behind the foreman's back as under his eye, would for a moment think of his boss as a slave-driver, or of himself as a slave. If these terms are ever used by miners anywhere on the Pacific Coast, it must be among that class that habitually shirks work, and impels the foreman to sing out, "keep that hammer going." Mr. Rule's experience was peculiar to himself. It is not and never has been the practice. The absurdity of the charge is shown at once by the rate of wages paid to miners—the substantial sum of $4 per day. That wage implies either a demand for miners, or the existence of a miners' Union, at once powerful enough to fix and maintain a rate of wages, to determine the length of the working shift, and to compel fair and decent treatment. The term, "slaves" and "slave-drivers" are wholly incongruous with the wage of $4 a day.

The water famine which existed in Mr. Rule's camp is regretable, but he is unquestionably in error as to that camp being in Nevada or in any other State of the Union—perhaps his geography is at fault. It would anyhow have been to the purpose if Mr. Rule had, while making his statement of his mining hardships in Nevada, specified the camp and the region where those horrors existed. It was not on the Comstock—where during the last several years the men have had to contend with the hardship of excessively hot mines, but only for short intervals—for there cool water and ice are supplied without stint. Nor does the condition of any mining camp in Nevada now or heretofore fit the statement of Mr. Rule. And we are forced to regard it as a harmless and exceedingly dry joke.

The complaint of the want of "humanising influences," of "no Sabbath day kept holy," is the merest puerility. Mines are not found in well-established cities, where the church, and the school-house, and the family and society exist, but in remote wild mountain regions. When men go to those regions they carry the good and bad that is in them, and they form the best communities possible under the conditions. As a reasonable man what else could the Cornish miner expect in the wilds of Nevada, or Australia, or Mexico, or South America? The fact is that for years the condition of our mining camps has been, under the circmstances, simply admirable. The license which inevitably attends the wild rush to a new camp soon subsides, and is followed by a degree of order and respect for law which is remarkable. Discomforts there are of course; but, on the whole, the fare and the wages and the means of happiness, to say nothing of the opportunities, of the miners on the Pacific coast are, we are justified in asserting, vastly superior to that of a similar class in any part of the world.

It not unfrequently happens that those who talk most loudly of absence of Sabbath quietude and of water are precisely those who neither appreciate nor assist to procure the former, and but too seldom trouble the latter, so that any anyone who makes a charge against a Nevada mining camp should at least be kind enough to inform your readers where he spent most of his leisure time on Sundays, while in Eureka (where there is a nice church and minister) whether at the church or in the whisky saloons. The next time Mr. Rule has anything to say of Nevada, he had better tell the truth, the whole truth, and nothing but the truth. But in some cases Mr. Rule states facts by accident, so that he may not have done so much harm to Nevada as he intended. He states that by hard work miners can earn 24*l.* 16s per man per month, and when he had spoken long enough to forget having said so, he stated another truth—that the cost or living (which means good lodging and good board complete) is 6*l.* to 7*l.* per month. Taking the higher price, that Mr, Rule may have no cause for complaint, it will be found that there remains 17*l.* 16s. per month to put by for a rainy day, which it is well to provide for, although Mr. Rule declares we are not troubled with rainy days in Nevada. At this rate the miner would have 213*l.* 12s. at the bank in a single year, which is a better balance than he would be likely to have in Cornwall in his entire working life. A LOVER OF TRUTH.

Nevada, U.S.A., Aug. 18.

THE MINERAL RESOURCES OF ARIZONA—TOMBSTONE DISTRICT.

SIR,—In travelling through mining districts so far away from San Francisco as is this one, my time is so limited and my occupations so numerous that I have but little time to write. I trust you will, therefore, make allowance for the brevity of these notes. The Tombstone district of Arizona, from which I am now addressing you, is on the south-eastern part of the Territory, 29 miles south from Benson on the Southern Pacific Railway, and 30 miles north from the Mexican boundary. Substantially, it is halfway between the railway and the frontier. The mineral resources of the district were first discovered about two years ago by a prospector named Schieffelin, a nephew of the Schieffelins, wholesale druggists, of New York. Schieffelin carried a piece of the "float" which he found on the hill sides to Richard Gird, at that time superintendent and assayer to the Signal Mine in the Mohave district, 400 miles distant. Mr. Gird, having assayed the rock, found it to be so rich that he proposed to Schieffelin and his brother who was with him to advance the necessary capital and prospect the district; this offer having been accepted, the three started out and arrived here in due time. The only signs of human visitation in the vicinity were some curious Indian carvings on rocks which I examined yesterday, and an "adobe" house which I viewed to-day. The latter had been occupied by an Austrian named Bronkow, professedly a miner, but as some suspect, a "contrabandistre" in league with Mexicans of the same calling. The three prospectors commenced their operations some seven or eight miles east of the Bronkow house on the western declivity of a gently rolling hill covered with brush, weeds, and grasses. As these operations progressed they laid bare a belt of porphyry overlying masses of granite, the porphyry belt being shaped somewhat like the hull of a ship, 12 miles long, 4 miles wide amidships, 3 miles wide at the stern, and tapering to a bow or point, where now stands the town of Tombstone. It was a porphyry ship stranded on a beach of granite, the bow pointing north. In the forecastle (to continue the figure) they opened up the Tough Nut and Goodenough Mines, now the leading ones of the district, and from these have already taken out a million dollars in treasure. The fore hold is still full of ore, and appearances indicate that the main hold will also prove rich. The general features of the ore body are a vein or channel of rich carbonates and chlorides in igneous rocks, chiefly porphyry, with talcose and manganese gangues. This ore channel traverses the ship for and aft, and is nearly vertical; its width is about 4 ft., but at short intervals it bulges out into swells and chambers, some of them of great size, and all filled with ores. At intervals porphyry floors are encountered which divide the masses of ores as the wax in a honeycomb divides the masses of honey, in this instance the dividing material lying generally horizontally. The miners go through this without hesitation, sure of finding a continuation of the ore body below. I spent several hours in these mines to-day, and have no hesitation in declaring them to be quite phenomenal both as to the situation and character of the ore channels and its connected ganglia and chambers. With regard to richness these mines are among the finest I have ever seen. To speak most definitely, the Tough Nut and Goodenough, as they stand to-day, are the two best silver mines in the district, and outside of the great Eureka mines it would be difficult to match them in Nevada. The following is from a local paper:—

Soon after the locations were made the two Schieffelins and Gird began to do the regular assessment work on their property, the first blast being fired in August, 1878, and subsequently, to develope the Tough Nut, being limited in their means, were soon obliged to suspend operations, but by the sale of the Contention Mine to Josiah H. White and W. C. Parsons, for which they received $10,000, they were enabled to resume active labour, which continued till November. The property was at this time under bond to San Francisco parties at $90,000, but at the expiration of the bond, the parties failing to come forward, the Corbin Brothers, of New Britain, Conn., and Philadelphia, through the efforts of ex-Governor A. P. K. Safford and Richard Gird, were induced to examine the property, and being satisfied of its great prospective value negotiations were at once entered into, and the result was the organisation of the Tombstone Mill and Mining Company in January, 1879. The officers were—A. P. K. Safford, president; D. C. Field, secretary; Richard Gird, superintendent—directors, A. P. K. Safford, Richard Gird, P. Corbin, E. L. and A. E. Schieffelin. The Corbins furnished the necessary capital to continue developments on the property, erect a 10 stamp mill, and make an ore road from the mines to the mill, build a dam, and construct 1½ mile of a ditch and flume to convey the water necessary to furnish the water power for the mill, all of which were successfully completed, and the stamps were dropped on the rich ores from the Tough Nut on June 1, 1879, and which have been kept in constant operation since that time, with the exception of about a month, during the necessary changes from dry to wet crushing. On March 15, 1880, the Corbins, Hamilton Diston, of Philadelphia, and marcus and Willis J. Hulings, of Oil City, Pa., purchased the entire interest of the Schieffelin Brothers at a valuation of $2,000,000 for the whole property, and by this transaction the Corbin mill also became the property of the Tombstone Mill and Mining Company. This is located within 300 yards of the Gird, is built on a solid rock formation, is a dry crusher, having a force of 15 stamps, with 5 more stamps being put in, which were in operation by July 1, and like the Gird mill is substantially constructed, very conveniently arranged, and supplied with the most approved machinery for reduction of ores, and is a model in all its workings.

Since the purchase by Eastern parties the company has been reorganised under the same name, with the following officers:—George Burnham, Philadelphia, president; Marcus Hulings, Oil City, Pa., first vice-president; Philip Corbin, New Britain, Conn., second vice-president; George S. Corbin, New York City, N.Y., treasurer; Sylvester C. Dunham, Hartford, Conn., secretary; Richard Gird, Tombstone, Arizona, superintendent.—Board of Directors: George Burnham, Thomas Cochran, Hamilton Diston, B. F. Hart, Richard Gird, Philip Corbin, George S. Corbin, Marcus Hulings, Willis J. Hulings, S. P. M. Tasker, and Chas. T. Perry. The company is made up of wealthy and influential leading business men of the East. It owns nine valuable mines, covering an area of about 180 acres of mineral ground, a millsite of 500 acres on the San Pedro river, which includes within its boundaries the towns of Millville and Charleston; they also own the exclusive water right to the Sonora line, a distance of over 20 miles, two mills, one 10 stamp, wet crushing, run by water power, one 15 stamp dry crushing mill, steam power, to which they have recently added five stamps more. The mines are provided with two steam hoisting works, one ore chute, with a capacity of 100 tons or more, is contracted for, and will be erected immediately.

BULLION PRODUCT.—From June 1 to March 14 the old company, with a 10 stamp mill, produced 148 bars, with a total valuation of $316,124·94; from March 14, with a force of 25 stamps, they produced up to June 20, 1880, $306,453·22, making a total production from the mines of $622,589·16; June to August, $300,000. The bullion product is now over $90,000 per month, which was increased to $120,000 or more since July 1, on which date they had a force of 30 stamps in operation. The company has on hand at the mills $130,000 worth of tailings.

DIVIDENDS.—The fifth dividend of $50,000 will be paid on Aug. 15, and as there is already ore enough exposed to run the mills two years, and present developments exposing new bodies largely in excess of consumption, and also furnishing an amount of ore sufficient to supply the mills with but little stoping, it will be readily seen that dividends are assured for a very long time. The company has a large surplus fund constantly on hand, and it is their policy to keep developments far ahead of present needs. Its affairs are honestly managed, and its mines have paid for outlay of capital from the start, and the company has never levied an assessment. Part of the ores are free milling, and are worked up to from 80 to 90 per cent., but averaging about $5 of their assay values.

As to the extent of the excavations carried on in the different claims to June 20, 1880, they may be stated approximately thus—At Tough Nut the total depth of the shafts was 955 ft.; total length of levels and drifts, 2745 ft.; total length of cuts, 509 ft. At Goodenough the corresponding figures are 260 ft., 888 ft., and 60 ft. respectively. At the other mines the total depths of shafts were—West Side, 113 ft.; Defense, 19 ft.; Surveyor, 10 ft. The shafts are about 5 by 7 ft., the levels and drifts 4 by 7 ft., and the cuts 4 ft. in width.

Since the above was written much growth has taken place. The town of Tombstone now contains about 500 houses and 2500 inhabitants, and Charleston, on the San Pedro river, nine miles distant, where the mills are situated, about 60 houses and 300 inhabitants. There is a great excitement in the neighbourhood, and new people are flocking in every day. Wages of miners in Tombstone, $4 a day; board, $8 a week; lumber, $50 per 1000 ft.; cordwood, $7·50, at $8 per cord; water to run the hoisting machines and for domestic purposes, 1½c. per gallon. At Charleston there is plenty of good water to be had for nothing. Mr. Gird has a fine mansion house at this place, and he and his estimable lady there dispense a refined hospitality. There is telegraphic connection with the rest of the world at both places, also stages, express offices, and every convenience that either the miner or the tourist may require. Elevation of mills about 4000 ft.; of hoisting works at mines about 4700 ft.; thermometer, 65° to 85° Fahr. in shade to-day. ALEX. DEL MAR.

Millville, Arizona, Aug. 13.

GOLD MINING ABROAD.

SIR,—The old adage, "It is not all gold that glitters," I think may very appropriately be applied to the many gold mining speculations lately brought before the public through the medium of your valuable Journal. I have not the least doubt but that some of them will turn up prizes; I fear, however, the majority of them will prove failures. I do not wish to say anything against any particular project, being a practical mining engineer myself, and thoroughly acquainted with gold mining in different parts of the world. I have had many opportunities for forming an opinion as to why so many gold mining enterprises prove failures from causes which your correspondents seem to overlook. If you will permit me to occupy space in the journal I should like to bring some of them to notice which have come under my especial observation; these same causes will equally well apply to other mining enterprises as well as gold mining. Everyone knows gold to be one of the most, if not the most, seductive of metals. Gold mining is as seductive as the metal itself. Let it be known that gold has been discovered in a certain place, immediately a rush sets in for that place, and an epidemic in the shape of "gold fever" seizes everyone at all susceptible of taking it even before they know whether it really exists there or not; the consequence is that many are ruined before they ever have a chance of knowing how.

Failures in gold mining abroad may result through a variety of causes, but I think they may be classed under one or other of the following heads, or of two or three combined. They may be enumerated as follows:—1. Science fraudulently or ignorantly applied in the preliminary operations.—2. Dishonesty of managers and promoters.—3. Capital employed in the discovery of excitements, instead of attempting to discover the means of working and realising mineral already discovered.—4. The inexperience of managers in working and utilising native labour and materials.

There are many other causes which conduce to the failure of foreign mining, but I think the foregoing are the principal ones, either directly or indirectly. What I mean by science fraudently applied is when a man who has gained some notoriety by his scientific attainments and writings as to be looked upon as some authority in geological and mineralogical matters, or in some other ways in connection with the treasures of the earth, and such a man allows himself to be employed at a high figure to lend his name to puff up a certain property, and to throw the public into a state of phrenzy through his sensational reports, when neither himself nor anyone else knows of the same except through native reports as handed down from one generation to another, and these, like all other sensational reports, never lose in the telling. I have heard such reports from natives in different places that would drive anyone frantic if they were at all susceptible of taking the gold fever, and such reports would furnish plenty of sensational matter for anyone inclined to use it and foist it on to the public as the result of his own investigations, and thereby make the first prime move towards the failure of the enterprise. It is a hard thing to suppose that a geologist or mineralogist should ignorantly apply his science with regard to mining enterprise, yet results will justify the assumption. I once heard of a celebrated geologist who went abroad to inspect a mine to report on its geological features, &c. After being shown through the mine, underground and at surface, he remarked to the mine captain in attendance on him that he had heard of a large porphyry or elvan dyke being in close proximity to the mine, but that he had not seen it anywhere underground or at surface. The mine captain told him he was then standing on it; so this celebrated geologist remarked that he had noticed a great difference in the rock he was standing on and that of a few feet off, but he thought it was the back of the lode he was standing on, and I have ample reason to suppose that such ignorance has been displayed in a similar manner in preliminary reports on gold mining fields, thus also helping to forward the cause of gold mining failures. However, that is not what I exactly meant by science ignorantly applied to mining operations. The science I meant is mechanical science, and in this way, before the qualities, capabilities, or necessities of the mine are ascertained, a lot of machinery is sent out immediately the company is formed which is totally unfit for the situation, and after thousands of pounds have been spent in getting this machinery to the mine, and causing no end of difficulty to the managers and other employees on the mine in trying to adapt it to the place and its requirements, it is then found out that it is of no earthly use, and if they have no further capital to fall back on for new machinery the mine must stop, or drag on a miserable existence for some time until it gets into debt; then new capital must be raised in some way or other to pay off existing liabilities and send out fresh machinery, and before that is erected and set to work successfully they are again bound to "cave in," as the Yankees say, for want of gold, not gold in the mine, but gold that must be spent before the mine can ever be prosperous. This may seem to some rather overdrawn, but I know of machinery lying out in the jungle or bush that cost many thousands of pounds to get there, yet it has never been of any earthly use in the place, nor never will be. And this, I fear, has been the fate of many a hard earned pound of shareholders' money, and has also been another of the great causes of gold mining failures.

I now come to the second cause of mining failures—dishonesty of managers and promoters. I have no intention of putting those in this class who would falsify their accounts or sell the gold taken from the mine to put money in their own pockets. Such cases sometimes happen, but they are quickly found out in some way or other, and their peculations cut short; and it can hardly be said that these have been the cause of any mine failure; but there are many other ways in which they can be dishonest, as is unfortunately too well known to those who have to suffer from it. And the way to which I refer is in the promoters making inflated reports, &c., and the managers feeding these reports by similar ones after they commenced operations, notwithstanding they know full well that these same reports can never be verified except by a very great eccentric freak in Nature. This, then, is among the first great causes of gold mining failures.

The third section of cause of failures brings us to the employment of capital in discovering sensations, instead of applying the means to work what is already discovered. Some years ago I was employed at a mine abroad that had but lately commenced operations; the same was entrusted to a scientific expert. There were masses of mineral already discovered, and the property was a very extensive one. I well remember the amount of walking I had to do in surveying it all. This expert started with ample capital to bring the property into a splendid paying condition, had it only been properly expended; however, instead of going to work to bring in water to work machinery, and to procure proper machinery adapted to the requirements of the mine, and in preparing the mine for economical working, he employed all the hands he could get hold of in making prospecting levels, as he called them, similar to the drains for laying water or gas pipes. He made miles of these altogether on different portions of the property, and many other such absurd works, and every week or so a long report, accompanied by elaborately prepared plans, and a long dissertation on the strata and small veins he had discovered, &c. This went on very well for some time, but no returns were forthcoming, nor the like of any, so the company sent out a practical man to supersede him, but it was to late to save the property. The capital had all been spent, and there was not enough left to procure the machinery and get the water in to work with, and bring the mine into a paying state; and then, through dissensions among the shareholders, extra capital was not raised, and the property had to be abandoned, which would otherwise, most likely, have been in profitable working by the same company.

I know of several similar cases, and so do many others, I have no doubt, thus making another cause of failure to gold mining operations; and the same class of operations has been carried on at other places, simply to discover sensations, when they knew from the start that nothing but sensations were ever to be found there; and this may be put down as an indirect cause of gold mining failures.

In reference to the fourth section, I do not mean to say that ex-

perienced managers are the exception; but this I do say, that many foreign mining failures are directly attributable to inexperienced managers. He may have been an excellent manager in this country, where he can get whatever he wants suitable to his requirements, but when he goes into an uncivilised country, and is thrown entirely on his own resources, he fails because things are not like they are at home; and then he takes to drinking, or otherwise neglecting his duties, and failure is sure to be the consequence unless he be relieved quickly. I have had men say to me many a time, "We never did things at home like that, we always had so-and-so to do it with;" but in those places such things are not to be had at a minute's notice, and something else has to be substituted, for the work cannot wait until the exact tools arrive out from England. What is wanted in a mine manager abroad is not only a man who has a thorough knowledge of mining, he should have also a good knowledge of applied mechanics, strength of materials, &c., a knowledge of machinery and how to locate it, especially considering future requirements; in fact, there should be nothing required to be done on the mine but what he should be able to do and take the lead in. He should be thoroughly honest and trustworthy, and should be implicitly trusted. He should be quick to adapt himself to circumstances, and make the best of everything around him. And I consider, however good a manager he may be at home, he will not, only in exceptional cases, make a good manager abroad.

Sept. 7. AN EXPERIENCED GOLD MINING ENGINEER.

GOLD MINING ABROAD, AND IN THE DUTCH WEST INDIES.

SIR,—One might almost be inclined to think, from the bitter tenour of his letter, that "An Old Subscriber" had been trying to get off a gold mining speculation of his own and had failed in the attempt, and that he had also been trying to worm himself in with the management of the Aruba Island Gold Mining Company, but that they would have nothing to do with him. He evidently thinks that every new thing has a golden handle, because he would fain have everyone believe that the hitherto untried Wynaad district is the best field for British enterprise; I would not say he is wrong, but I feel assured in my own mind that "all is not gold that glitters," even in that, at present, much favoured district. From what I have been able to learn, the Aruba Island Company, like many others, have been unfortunate in the managers they have sent out there; and without good management at the works, we all know, success keeps in the far distance. Judging, however, from my own experience in different parts of the world as a gold mining engineer, and the several reports, &c., on the Aruba Island gold field, I think that with a really good manager on the works, and a little fresh capital, the company have a splendid property there; but one thing I should recommend them to bear in mind that quantity of pay rock, not extra quality, is the essential to ensure success in gold mining, as verified by the returns of all the successful companies now in existence. As to wind-power being a novelty, perhaps "An Old Subscriber" has never been far out of London. I could name to him places where there are more windmills than would crush even 8000 tons of quartz per month. If they will do one kind of work why not employ them for quartz crushing, where the wind is to be relied on, like it appears to be on that island; it is as cheap a motor as water, though perhaps not altogether so reliable, but like this latter it can always be supplemented by steam when it fails. The only objection I see to windmills being employed there is that the West India Islands are subject to hurricanes, which might at once demolish the whole structure. So might a boiler burst, or a dam break away, and either of them do quite as much damage. As to new processes for working tailings, I have seen many tried, and have read and heard of others, but as yet none seem to have been successful, notwithstanding there is no reason why some process may not be soon found out. I think a plan I have worked on myself is as good as any yet known for working pyrites tailings, and that is cheap concentration to as high percentage as practicable, and sell them in that state. A great deal more profit can be got in that manner than any method I know of for extracting the gold from it. Anyone practically acquainted with gold mining knows that; large quantities of moderate pay rock, cheaply mined, expeditiously handled, efficiently crushed, and as much gold as possible extracted by first process, through being carefully watched and directed by one who thoroughly knows how to treat the different classes and qualities of ore to be found in every mine is the only direct road to successful gold mining operations. In such a case the tailings are of but little value unless very cheaply concentrated, but tailings thrown away by inexperienced hands will ruin any company, and make the fortunes of those that come after when they know their business.

Birmingham, Sept. 7, ——— GOLD MINING ENGINEER.

THE EMMA SILVER MINING COMPANY.

SIR,—I am glad to see by last week's Journal that the Emma Company is likely ere long to emerge from its cloud of litigation, and instead of being a lawing company any longer resume its functions as a mining company. I believe an offer has been made by Mr. Park for a reconstruction on terms most favourable to the shareholders, inasmuch as they will not be asked to subscribe one penny towards the new company, but will be put in possession of a dividend-paying property free of any liability, provided the lawsuits, both here and in America, are closed. As a shareholder in the Emma Company, I trust the directors will call a meeting to consider the offer. In the meantime I advise my brother shareholders not to part with their holdings. The Stock Exchange men are buying in the hope of the shares reaching 8*l.* or 9*l.* each before Christmas, and it will be just as well if the shareholders hold on and secure that price themselves. We shall see a very big rise in Emmas one of these mornings.

Sept. 7. ——— A SHAREHOLDER.

EMMA SILVER MINING COMPANY.

SIR,—I can scarcely express the pleasure I felt in reading the announcement in last week's Journal of the handsome proposition made by the present American owners of the Emma Mine whereby the property will once more come into the hands of the English shareholders. As to the charges of fraud against Messrs. Park, Grant, and others, they were only based upon an afterthought, and I always considered them so utterly frivolous that I never lent my support to them. The shareholders bought the mine with their eyes open. Everyone knows the district to be bunchy, although very rich, and if investors despair whenever there is a temporary absence of bonanzas they certainly are not the sort of men to connect themselves with Utah mines, nor indeed with any of the mines on the Pacific Coast. The offer of 80,000*l.* for the withdrawal of charges which cannot be substantiated, and which if they could would neither benefit nor put money into the pockets of anyone, is one which is seldom made, but which being made should be at once accepted.

But if the American owners and Messrs. Grant and Park will consent I should much prefer that the existing Emma Company should be entirely dissolved or reconstituted, so that the large purchase money originally paid may sink into oblivion, and the dividends to be paid in future thus made to bear a fair relation to the nominal capital.

As it is desirable to retain the old name I would not wish it changed, but the new company should be registered with a nominal capital of 180,000*l.*, in shares of 1*l.* each, a clause in the Memorandum providing that 150,000 of such shares should be given to the liquidator of the old company as payment in full for all property and rights possessed, or supposed to be possessed, by the 1872 company or any persons claiming under it. The remaining 30,000 shares would be handed over to the present American owners in exchange for an unencumbered title to the property, and 40,000*l.* to be employed as working capital. The present Emma (1872) shareholders would be entitled to five Emma (1880) shares for every two old shares surrendered if the old capital be, as I believe it is, 60,000 shares, of 20*l.* each; or if there be only 50,000 shares to extinguish it would be the still more simple proportion of three new shares for each old one. I am convinced that these new 1*l.* shares would be marketable at little less than par, which would be equivalent to raising the market value of the mine 30 or 40 per cent., the full amount of which improvement would go into the pockets of the Emma (1872) shareholders, and thus give them a good average annual percentage of profit on their investment for the whole period since they first subscribed, and as all future dividends would be calculated on 180,000*l.* nominal capital instead of on 1,000,000*l.* or 1,200,000*l.* the market value of the shares would never probably fall below par.—*Sept. 7.* SHAREHOLDER.

THE TECOMA MINING COMPANY.

SIR,—One of the best of the low-priced foreign mines now on the English market is the Tecoma. A plan of reconstruction will shortly be submitted to the shareholders, and as only a small sum—a mere matter of a few thousand pounds—will be needed to make the Tecoma Mine one of the best specs in America, I must ask the shareholders (and I am one of them) to "put their shoulders to the wheel" and pull the Tecoma property out of the mire it has drifted into.

Sept. 6. ——— OBSERVER.

MINING AGENCY—WHAT IS WANTED.

SIR,—I should like to draw the attention of the young mining and metallurgical student of the present day to the demand which exists, and must increase, for well instructed mining engineers to manage the various gold mining undertakings which are now before the public. The world will not want any of those broken-down clerks, secretaries, and mine captains who sign themselves "C.E." and "Mining Engineers." It will want properly instructed people, qualified to give opinions on the new concerns put forward, and this class of men is not now to be found.—*Sept. 5.* AN OLD MINER.

CHINA-CLAY.

SIR,—As in many other things so in china-clay, accident is the parent of discovery. In most cases it is more than likely that china-clay was first discovered by tin streamers, who have been the principal discoverers of some of the most valuable deposits, and also had the honour of first exposing many of our best mineral lodes. The most general feature presented by clay-bearing ground is what is locally known as a "slad." It must not be understood, however, that no clay ground is to be found where this "slad" is absent, nor that where this "slad" is present clay must necessarily appear; but it is, nevertheless, a general concomitant of clay-bearing ground, and is supposed to be caused by the decomposition of the underlying granite. This "slad" is prevalent on the sides of the Hensbarrow granite boss, and china-clay works cover nearly the whole area. The clay is simply inexhaustible, and the demand is daily growing. There is scarcely any industry in our history as a nation that has so slowly and steadily increased. There are now about 100 works in Devon and Cornwall producing altogether about 250,000 tons of china-clay per annum. If we take the average present price of china-clay free on board at 16s. per ton, and the average cost of putting free on board (including lords' dues) as 11s. per ton, we shall have a margin of 5s. per ton, which must mean that 250,000 tons give a yearly profit of 62,500*l.*, or about 625*l.* per annum from every china-clay works in operation. I am now preparing some approximation as to the amount of capital used to obtain this return: and I am confident that I shall be able to show that a china-clay works is one of the best investments in which capital can be employed.—*Roche, Sept. 8.* J. H. B.

CLITTERS MINE.

SIR,—A writer in last week's Journal, referring to this mine, while correcting the statement in reference to the number of tons of ore sampled for the last two months' working was certainly in error in computing the value of the ore, whether intentional or not remains to be seen. I deem it only fair, therefore, that the public should know that the ore, instead of being worth only 5*l.* 15s. per ton, as stated by your correspondent, should at the present standard for copper be worth 7*l.* per ton—making a difference of 537*l.* on the 430 tons of ore, or 33 per cent. more profit than he chose to show. This can be easily verified by anyone who may choose to take the trouble to do so, the produce for the whole being between 11 and 12 per cent.—*Tavistock, Sept. 8.* S. KELT.

LEAD SMELTERS, AND LEAD MINERS.

SIR,—As the seemingly low prices obtained for lead ore at present prevents the profitable working of many mines in Cardiganshire—amongst which I may name the Powell United, De Broke, and others—I am led to ask the question, what is a fair price for lead ore dressed to a percentage of 80, delivered f.o.b. (say) at Aberystwith, the lead being worth, as at present, 16*l.* 5s. per ton? The 80 per cent. at this price gives 13*l.* for the ore, to which you may fairly add 1*l.* more for silver contained in it, or making the value of the ore 14*l.* per ton. For this class of ore the Frongoch, Red Rock, Caron, Cwm Pryf, Grogwinion, and all others are getting barely 10*l.* per ton for their ore—thus allowing 4*l.* per ton for freight and returning charges. Are they getting a fair and honest price for such ore? I believe not, and that the shareholders in these mines are sacrificing many thousands of pounds annually for the want of a smelting-house in the centre of this mining district, which might easily be accomplished by a few gentlemen who might seriously entertain the matter. The mines I have mentioned are returning some hundreds of tons monthly, whilst in the North of England some mines only returning 20 or 30 tons of lead monthly have their own smelting-houses, and smelt their own ore.

I have not mentioned the mines in Cardiganshire whose management are connected with smelting-works; but these, too, I think, would find the benefit of a local smelting company, as was the case at the Smelting, near Devil's Bridge, 50 years ago, where the ores of the then rich Cwmystwith, Ystymtean, and other mines were run down into pig-lead. That the lead mines of Cardiganshire have produced very large quantities of silver seems to be certain from the establishment of a mint at Aberystwith, in the reign of Charles II. I believe a smelting company established for the purchase of ores in this county would prove the present companies are receiving neither a fair price for their lead or silver. That capital could be raised for this purpose there is little question. It only wants the attention of two or three plucky gentlemen to carry it out. I wish this may soon be the case.—*Sept. 2.* ——— A SELLER OF LEAD ORE.

CORNISH MINING.

SIR,—While endeavouring to point out fair and legitimate speculations for the guidance of investors it must not be overlooked that there are many mines destitute of the smallest chance of becoming profitably productive, while others have attained a price quite equal to their yield—yet no time in the annals of mining has offered more favourable opportunity for the investor than the present: indeed, shares in mines of the highest prospective value are to be obtained on terms that ere the year expires must enter the Dividend List, and enhance in market value tenfold. I have long advocated the working of new or unwrought mining ground, not only as being the least expensive, less risky, and safest medium for investment, but that no enterprise pays like a good mine. The development of some known to the writer lying parallel and adjacent to the most productive mines ever wrought show evidences near the surface of untold wealth at a comparatively small depth in the Gwennap district (the richest in Cornwall). The Carn Marth granite hill, forced up by volcanic power, and forming veins in which are found most abundantly metallic deposits, is the centre of its great mineral hotbed. Around such upheaves by far the greater portion of the mineral wealth of Cornwall occurs. Confirmatory of this is the discovery of tin at Mount Carbis Mine, situate on the western flank of Carn Marth, where at a depth of only 30 fms. has been laid open for 25 fathoms long ground estimated to produce 2500*l.* worth of tin in the back of the level, with a good lode gone down below. This is evidently the top of another of those great deposits of mineral for which the district has long been celebrated. The surface outcrop of the lode at United Mines, on the corresponding flank of same upheave to the east, was discovered by a working miner at a depth of only 20 fathoms. He earned over 1000*l.* as his tribute part of ore in four months. It led to extended operations, the result being the proprietors reaped a profit of something like half a million sterling. Another instance at the foot of same upheave is that at Wheal Unity, where two men sunk a trial pit on the outcrop, and made a discovery at about 10 fms. deep, which led to profits giving many of the present Cornish families their influential positions and wealth. At Tresavean and Penstruthal following the surface outcrop led to the division of profits in one year of 125,000*l.* The working of shallow mines in unwrought ground gave profits which founded the richest families of the county, and it must be remembered that to work half-a-dozen such mines does not require the capital necessary to resuscitate one deep extensive mine, while the success attending such opeaations is doubly sure. Some mines in operation around the Carn Marth granite hill, judging from analogy, must ere long enrich those through whose judgment and energy their development depends.

St. Day, Scorrier, Sept. 2. ——— CHAS. BAWDEN.

WOTHERTON MINE.

SIR,—I am much obliged to your Salop Correspondent for his gratuituous advice. I am well aware that most of the mines in this district are in the Llandeilo flags of the Lower Silurian formation, and that these flags are assumed to have a thickness of 1200 ft., which is, I believe, their greatest thickness. Now, according to your Correspondent, the mines in this district are worked about the middle of the Llandeilo flags; therefore, as Tankerville is about 1500 ft. deep, and commences about the middle of them, it must be at its present bottom some 900 ft. below the Silurian, or in the Cambrian formation. Again, if we suppose Tankerville shaft to have been commenced immediately on the top of the Llandeilo flags its bottom would then be 300 ft. below the Silurian—also, Snailbeach is about 1300 ft. deep. Therefore, the bottom of that mine would extend 700 ft. below the Llandeilo flags, and, if it is possible, according to your Correspondent's arguments, for the veins to extend so far below the Llandeilo flags, why should they not extend as far above it, providing there was a superimposed stratum; and, if so, we shall not have so far to sink at Wotherton? This argument I base on your Correspondent's own theory "that the lead ore in this district is worked about the middle of the Llandeilo flags."

Again, no strata preserve an uniform thickness over a large extent of country, or under it rather. So the Llandeilo flags, with a maximum thickness of 1200 ft., are not supposed by geologists to maintain that thickness everywhere they are found; and in that case no one with or without a geological map can tell the thickness of any stratum before it has been proved. This has been verified in some of the mines here, where sections have been made, showing a certain stratum up to which they have driven to have a certain thickness. A little driving has, however, proved the section to be false; and, again, if it is possible for a map showing a section of one part of district to be used for another part, why should companies go to the expense of boring to prove the strata? The best thing to tell the thickness of strata in any particular locality is not a geological map, but positive proof and a good knowledge of the different strata and their inclination. Your Correspondent says that the barytes at Snailbeach is found in one part of the mine, and the lead in another; but I believe that the lead and barytes are both in the same lode, and the lead under the barytes, as stated in my former letter—and that is where the ore was discovered first. Of course, as the barytes weakened lime-spar and lead strengthened.

The theory of the formation of mineral veins is in such a state of infancy as not to justify anyone giving too decided opinions, especially when they get their information from maps on a small scale, where a few hundred feet make but little difference. BARYTES

Chirbury, Salop, Sept. 2.

EAST CARADON MINE

SIR,—Attention having recently been directed in the Journal to this mine by several shareholders who appear sanguine that its future will equal its former prosperity I have, for my own satisfaction, caused the back files of the Journal to be searched for information concerning its past history, which is probably not known to the majority of the prssent shareholders; and, as it may be of some service to them, perhaps you will give publicity to the facts I have ascertained.

I will first quote from a passage in the Journal of March 30, 1861, showing the estimation in which the mine was then held, which is particularly pertinent to its present prospects, insomuch that its near future will probably prove to be parallel with the most properous period of its career:—

> As an instance of how soon the market for any particular stock improves upon discovery in a mine we have had an example in East Caradon, which rose 18,000*l.* in market value about two hours on Wednesday morning, when it was rumoured that the caunter lode had been cut into at the 60. . . . Two and a-half feet wide, worth 35*l.* per fathom. . . . The mine has now reached a value of 120,000*l.*, and not more than two years ago the shares were sold at 1s. 6d. per share—thus showing not only a remarkable instance of perseverance and good fortune, but that the miners' motto should ever be "Nil desperandum."

I will now trace the progress of the mine from the spring of 1859, when the shares were selling at 1s. 6d. each, to the time of the first great discovery. On Oct. 1, 1859, J. Seccombe, then captain, reported that—"In driving the cross-cut south in the 40 the gravel is a little easier for progress; in driving the cross-cut south in the 50 from William shaft the ground is favourable." It may be noted at this date that the shares were at 2¼; but there were no dealings on the Exchange, where they were regarded with little favour. In a report three weeks late W. Taylor writes—"The caunter lode has been cut into, worth from 50*l.* to 60*l.* per fathom, and the new lode opens out fully 25*l.* per fathom." Two days after this—Oct. 24—J. Seccombe and J. Truscott reported that the lode was 3 ft. wide, yielding 6 tons of ore per fathom, and that the new lode was considerably increasing in size.

It will be observed that the nature of the lode passed quickly from an unproductive state to one of extreme value, and that the only indication of this great change was that the ground was a little easier for progress, and that the lode was widening. The mine is now showing indications strikingly similar to those that were presented immediately before the great discovery above noted. The ground in the winze in the bottom of the 150, on the caunter lode, is once again easier for working, as shown by the more rapid progress in sinking during the current quarter, and also by the gradual widening of the lode from 1½ ft. in January last to 2½ ft. in July. A private report has just been shown me, which says that the lode has now increased to 3 ft. in width, showing a better appearance than before seen in the winze, with more peach, similar to the lode above the elvan, and one would judge from the character of the lode that there is a great change near for the better; and the report concludes "the winze is decidedly nearing a change."

Further facts could be given, but I have already trespassed too far on your space. As history repeats itself, so I anticipate fortune will soon again favour East Caradon.—*Sept. 2.* D.

P.S.—The last report of Capt. Kellow in the Journal of Sept. 5 corroborates the intelligence I had previously received from a private source that the lodes at the 150 had widened to 3 feet.

CHEAP MINES—WEST CHIVERTON.

SIR,—I find in writing my letter of last week, owing to the absence of my notes on the subject, I rather confused my references to the times and amounts at which shares in West Chiverton were selling. As I have a strong dislike—to put it mildly—to anyone attempting to mislead me, I have a corresponding objection to misleading others, and I therefore ask you to kindly insert this letter in next week's Journal, with the view of rectifying somewhat the errors contained in my last. I see I have stated that "in 1876 shares were down at 2*l.*, and again in 1878 they were up at 19*l.* each, and the mine paying substantial dividends." This is partially correct, but it is also partially incorrect. What I ought to have stated was "that the mine was paying dividends from 1875 to February, 1878, when it ceased, and at the latter end of 1878 shares had declined from 19*l.* to 15s." Since then the bottom workings of the mine have been abandoned, and operations resumed upon the shallower levels, where in this particular mine the greatest riches have been found; and from information I have received during the present week these are being pushed on with all possible speed, and already in the 80, east of Hawke's shaft, a lode of considerable promise has been met with, while the cross-cut at the 70 is passing through strata very congenial for the production of silver-lead ore when the side lode is intersected.

I certainly do not agree with Mr. Symons in his article on the Chi-

verton District—that West Chiverton is to all appearances pretty nearly exhausted; as present appearances are very hopeful and encouraging in that direction, and if Mr. Symons had followed the reports from the mine, or examined the mine itself carefully, I am sure his judgment would have led him to a different conclusion. However, I do not doubt that before many weeks have gone by we shall have something like a realisation of what present appearances indicate, and those of us who have had the temerity to retain our interest in the mine will be well rewarded for our confidence.

Sept. 8. OBSERVER.

THE COMBMARTIN MINE.

SIR,—This mine has been working for four years, during which time a large amount of work has been done, and two highly promising lodes discovered 31 fms. from surface. One of these lodes for many fathoms has produced a large quantity of mundic, an unfailing indication of a deposit of silver-lead in the locality. From a level driven on this lode the company is about to drive a cross-cut to intersect another lode, in which it is stated as a positive fact there is a fine bunch of rich silver-lead ore standing, To reach this point we shall have to drive about 32 fms. at a cost of about 500*l*. The mine was originally in 6000 shares, but owing to a large number of deceased adventurers shares relinquished; the present number of shares is 1841, upon which 22s. per share has been paid. To raise funds to accomplish the work alluded to I have been instructed to offer 2000 of the relinquished shares at 7s. 6d. each; and I shall be happy to receive applications for the same on or before Sept. 16 if anyone feels disposed to take an interest in an adventure of more than ordinary promise. I may add that at the last general meeting the accounts to June 12 showed a balance of 34*l*. 5s. 1d. against the mine, and a call of 2s. 6d. per 1841 share was made. The richness of the ore of Combmartin is well known. Some ore broken from one of the lodes already discovered gave a produce of 500 ozs. of silver to the ton of ore, and there is every reason to believe that the cross-cut now proposed to be driven will result in a valuable discovery of high-class ore. The mine is worked to the present depth without machinery, and the present monthly cost is about 70*l*. JOHN WATSON, Secretary.

79½, *Gracechurch-street, E.C., Sept.* 9.

EAST ROSE.

SIR,—Your excellent correspondent, Mr. Symons, is somewhat in error. East Rose has not only been thought worthy of further trial, but there is proof that with an adequate capital success is more than probable. Thus, I believe, it is to be re-worked. I give this information (as to the re-working) with reserve, as I have no interest whatever in the property, neither do I know any of the intending shareholders. My sense of justice prompts this information.

OLD SHEPHERDS.—An enormous sum has been spent in litigation over these mineral rights, and the Commissioners have won the day. This may fairly be taken as a strong indication—if not as a proof—of the extraordinary value of the mine. Numerous applications have been made for a lease, and the authorities have been very impartial in their selection. The lease is, however, being prepared for the successful applicants, who are being congratulated on all sides.

Walbrook, London, Sept. 10. JOHN B. REYNOLDS.

THE EAST WHEAL ROSE DISTRICT, &c.

SIR,—It is not always the case, as Mr. R. Symons remarked on the above district in last week's Journal, that a number of mines are started in the locality of a rich mine, at least some of them are not. In the year 1836 my attention was directed to some lodes in the cliffs at Carnewas, in the parish of St. Evoe, from which place I examined the cliffs west to Mawgan Porth, Water-gate Bay (in which in the cliffs are Tregarrian and Trebelzue mines) and Porth, in St. Columb Minor, and from thence to Portreath, I discovered indications of mineral near St. Columb Porth, and slight trials were made on some of the lodes. An adit was also driven with the view of intersecting the lodes, but stopped short of the object. This was known as Mwyanna Mine, and the trials were made long before East Wheal Rose was a rich mine. I spent two pleasant days in this district with the late Mr. W. J. Henwood about the time referred to, and it was and is the opinion of several good authorities that there is a valuable silver-lead mine not far from St. Columb Porth. W. T.

County Cork, Sept. 6.

EAST WHEAL ROSE, AND OLD SHEPHERDS.

SIR,—A gentleman informs me that East Wheal Rose is likely to be reworked with a capital of 50,000*l*. If this be so it will confer a great good on the population of that district and on the city of Truro, whence most of the supplies would be derived. No one who knows the mine doubts that large supplies of lead are there.

The same gentleman says that a lease is being prepared for the reworking of the Old Shepherd's Mine, which is situate in the same district as East Wheal Rose. For the last 40 years this subject has been under consideration, and numerous applications have been made for the needful authority to work the mine, which yielded such enormous profits to the late Sir C. Hawkins, Bart., as has been alleged. There has been all along, and is now, but one opinion as to the propriety of a further development of this property, all concurring in the belief that it is of great value as a silver-lead mine. I hope that the company now being formed will have their most sangine expectations realised. The working of this mine will confer an additional benefit on the district and the city. R. SYMONS.

Truro, Sept. 6.

WHEAL UNY

SIR,—I read in a local newspaper a report of the proceedings at the last meeting of the shareholders in Wheal Uny, and was much surprised to find that the majority voted for *such* a committee as involved the relinquishment of the manager's agency. He said that if a certain gentleman nominated for that committee were included in it he would have nothing more to do with the mine. The retention, therefore, of that name implied that they, the majority, did not wish Capt. Rich to remain as manager; or, perhaps, they thought he would not act upon his threat. I have been informed that he has since sent in a formal resignation, in which he acted rightly. I should be pleased if the committeeman in question possessed antecedents so pure as those of Capt. Rich, who has always acted in the best possible manner towards the shareholders. I believe that no agent could have done better in his position than Capt. Rich. It is always difficult to satisfy the adventurers in a "calling" mine for a lengthened period. Wheal Uny has been a losing speculation for many years, and there is little or no prospect that it will be different in the future. I have long thought that all the hopes of its becoming self-supporting are delusive, and will not, probably, be realised. In the interest of the adventurers the best course to be taken would be to stop the engines, draw up the materials which are underground, and hold an auction for the disposal of all the machinery and effects on the mine. If they do not so they will repent for their perseverance, because they will in my opinion come off with an increased loss. The company have shown great patience in contending so long against the poverty of the mine. I would recommend them to contend no more. I have no interest in the concern, and I suggest that course purely in the interest of the shareholders, without expecting anyone's thanks.

Truro, Sept. 7. R. SYMONS.

SOUTH POLGOOTH (NEAR OLD POLGOOTH).

SIR,—The engine-house is up and covered in, and the engineers are busily engaged in heaving in the engine, which it is said will be completed this month. The lode here is said to be one of the best in Cornwall, and is 14 ft. wide; this is what is called the main lode, there being several others in the sett. A few cart-loads of the lode was carried down to a little water stamps, and only water enough to work two small heads, and in three weeks they sold 25 cwts. of tin, making 53*l*. 5s. per ton. I am not aware that any other such a result was ever known in Cornwall before, and they have now at the surface 100 tons of this rich lodestuff awaiting the steam-stamps now in course of erection, and a stope laid open at the 10 fm. level 12 fms. in length, and the lode in both ends east and west is very rich for tin. The management is in the hands of one of the most experienced men in Cornwall, as will be seen on entering the mine great economy and practical knowledge has been used. The St. Austell people are in hopes this rich mine will be the means of opening others in the district. AN OLD MINE AGENT.

Roche, Sept. 9.

WHEAL COATES, AND LIMITED LIABILITY.

SIR,—In last week's Journal I find another letter on the Cost-book and Limited Liability Systems, signed by "Independent," He speaks of Wheal Coates. Perhaps your readers are not aware that this is likely to be one of the prizes of 1881, and that at the present time they are raising upwards of 60 tons of tin per annum. That these shares should be selling at 35s. each is a mystery to me. The constitution is limited. The mine must enter Dividend List, and that perhaps soon. Had this been a time of activity these shares would probably be at 3*l*., and cheap at that. Your readers who want a sound investment should enquire about this mine and buy the shares at once. LOOKER ON.

EXPLOSIVES AND DETONATORS.

SIR,—Although there may be some difference of opinion as to wherein lies the advantage of using a detonator, it is, I think, generally conceded that there is a very decided advantage somewhere. It is pretty well established that in exploding all explosive compounds there is a greater development of power when detonators are used. It is pretty well understood that this increased development of power is much beyond what can by any possibility be attributed to that contained in the detonator itself. This being so it appears plain that all the detonator does is to fissure the charge sufficiently for it to become ignited in every part instantaneously and before explosion has commenced. If this be true detonators that can be exploded by concussion are not required; we may as well have one that explodes only on ignition. If it be contended that great explosive strength is required in such detonator, that may be provided for in making it a little larger than those at present in use, for we are not bound very closely in this matter. All we require is a powerful detonator, of moderate dimensions, that can be safely handled. Good strong gunpowder might perhaps be used, for I have never found that it is particularly dangerous to explode dynamite by gunpowder, instead of by the detonators commonly used. I do not care what it is, so long as it can be exploded on ignition and we are comparatively safe. I have no doubt the time is not far distant when these murderous things, which have cost so many valuable lives, will be abandoned altogether; and perhaps a little further on we may see the safer guncotton preparations, if not a more powerful gunpowder, superseding the present dangerous nitro-glycerine compounds, which always seem to leave the unmoved rock unsafe to work on for a considerable distance beyond the centre of explosion.

Redruth, Sept. 8. W. TREGAY,

MINING IN CARDIGANSHIRE—WATER SUPPLY AND STORAGE.

SIR,—I see a statement in last week's Journal on this important subject signed with the initials "P. J." (Goginan)—"That all the higher waters of the Camdwr river and other tributaries of the Rheidol were secured many years since by Mr. John Taylor and his advisers." If "P. J." means that Mr. Taylor or anybody else can impound or divert the waters of a river or its tributaries from its and their natural channel so as to deprive anyone on the banks of the river of the enjoyment and use of the water in its natural and ordinary flow and channel according to their several requirements, "P. J." is as much mistaken in his knowledge of riparian law as it is possible for anyone to be; and if Goginan and Bwlch United Mines are dependent upon water obtained from the Camdwr river upon such a supposed security, as against the rights of parties having mines situate on the banks of that river, they occupy a very unfortunate position indeed. If "P.J." will incur the expense of consulting counsel learned in the law on the subject he will find he can convey what water he likes into the channel of a river, but when once there it becomes the natural water of the river, and he can take none away, not even that which he has himself conveyed in, so as to deprive anyone on the banks of the river of the right to use it, hence the necessity of conveying artificial water-courses or conduits over the channels of running brooks and rivers in launders so as not to interfere with their flow, for if the artificial once mixes with the natural stream it becomes in law incorporated with it, and cannot be again diverted; and as no one has the right of diverting the waters of a river so as to deprive those on its banks of their natural right of enjoyment and use, no one can legally grant this right to others; therefore, no one can by any course or operation of law acquire such a right against the ordinary common law rights if the parties on the banks of the stream require the use of the water. Parliament alone possesses the power of diverting rivers and streams without the consent of the persons who, from their situation as owners and tenants on the banks of the river or stream, have the right to the use of its or their flowing waters, but this power is always exercised with the greatest forethought and care, and ample provision is always made for the requirements of all entitled, and full compensatson given for anyone injuriously affected.

PROVINCIAL SOLICITOR.

CONTINUITY OF ORE DEPOSITS IN CARDIGANSHIRE.

SIR,—I a former letter I drew attention to the fact that two rich mines on the same and one lode are not to be found in this county conjointly. It was not my intention to condemn any particular mine, far less the whole district, and I do not think any such inference could be fairly made from my letter. But I thought, and still think, that the practice of dropping old local names of mines, and substituting east, west, north, and south so-and-so, is not only confusing, but is likely, having reference to antecedents, to unfavourably impress old mining investors. No doubt in some instances such new names indicate the real position of the mine as being east, west, &c., of such and such a mine, but in many instances it is not so, and I contend that in the one instance it is misleading and in the other discouraging. Several of your correspondents have nibbled at my statements with more or less ascerbity, but only one of them has ventured to produce instances in contradiction. These are Wymess Mine and Bwlch. As to Wymess Mine I saw it stated in the report of a competent civil engineer that this mine was until lately part and parcel of the Frongoch, and that it was separated therefrom through some disputes as to boundaries and royalties. If all mines were subdivided according to the several boundaries of different landlords there would of course be no paucity of instances against me, but even then but few subdivided properties would be worth working separately. As to Bwlch, looking at the reports and the trustworthiness of the management, there can be no doubt of its being a *bona fide* and promising investment, but is it not true that between Bwlch and the old Goginan—I mean the Goginan that made the large profits in a former generation, and so often referred to by some of your correspondents—there is the best part of a mile of unprofitable ground? If so I contend that this is not only in favour of my argument, but also in favour of Bwlch. The lode having had a good nap is much more likely to wake up strong and healthy again. Your correspondent says that he could see instances which disproved my statements from the chair he sat upon. Would he oblige me by turning his face from the east towards the west and then prophecy?

I know that some of your correspondents have a peculiar way of computing the value of mines, for I have many times noticed mines being called rich which have never paid their way even after swallowing capital after capital. Some of these failures no doubt are attributable to want of sufficient capital to begin with, and the small proportion of nominal capital which has been applied to actual mining—but is it not a fact that most of the best mines in Cardiganshire have made their largest profits above (say) 60 or 70 fms. below adit, and that there are not many instances of abandoned mines being reopened with success below that depth except in a few instances, such as Cwmerfin, where parallel lodes have unexpectedly been met with. Is it possible there may be many more such instances to be met with in Cardiganshire, and those who will pay more attention to cross-cuts and longitudinal extensions may convert many an abandoned mine into a profitable concern.

I am not competent to say whether from a geological point of view there is anything to justify the deeper sinking of Cardiganshire mines, but while you have only one or two short shoots of ore to play upon, as is the case in many of the mines that have come under my notice, the cost of sinking shafts and winzes, driving levels, &c., will absorb most, if not all, the profits derived from the stoping ground as you go on. Thus you go on from one depth to another, fully expecting that after sinking another draft the long expected dividends are going to come, whereas, in fact, the mine is eating its own head off day by day, and stage by stage is being picked to the bone before another is opened up, until at last arrives the unwholesome news that both mine and capital are exhausted. Then comes the new company with the new name, which is going to benefit by the experience and expenditure of the old, but in most cases the old tale is told over again with a vengeance. That this is not only the case in lead mining, but also to a large extent in slate quarrying, no impartial observer can deny.

That this state of things is often only the result of the undue pressure brought to bear upon managers is no doubt only too true, but it is in the power of every shareholder to assist the formation of a more healthy state of things by keeping a sharp eye on the only true barometer of legitimate mining—the reserves—the rise or fall of which should, as a rule, enable any shareholder to form a pretty correct estimate of the value of his investment, and should in any case where the reserves—or, in other words, stock—is taken, and given with any degree of fidelity, prevent his being taken by surprise by any sudden collapse. It is but very seldom that careful stocktaking of reserves is insisted upon in mining, and it is, therefore, not to be wondered at that where they are voluntarily given it is often with little regard to exactness. Only let careful stocktaking be insisted upon periodically and sentimental reports will soon begin to look pale in the face, to the benefit of mining and investors.

The mining district of Cardiganshire is generally supposed to include the whole county, whereas, in fact, it only covers a small section of the north-east end of it. Just take a compass and place one point of it on Plynlimmon, and with a radius of about 12 miles you will not only circumscribe all of the best mines in Cardiganshire but also in Montgomeryshire, including Van in the east and Lisburne and Grogwinion in the west. Considering that this district is deeply bored and excavated in all directions, it surely should be no very serious matter to construct a reliable mineralogical map on a suitable scale of it. I may refer to this subject another time. NEMO.

THE ANCIENT MINES OF CARDIGANSHIRE.

SIR,—We often see in the Journal references to the ancient workings of Cardiganshire, and the wealth derived therefrom by Sir Hugh Middleton and other local mining magnates, but I have not seen any reliable history of Cardiganshire mining previous to the current century. I have, however, been told that a certain work "Meyrick's History of Cardiganshire" contains very valuable records of Cardiganshire previous to that date, and if any of your readers are in possession of this work I think they would be rendering valuable service by favouring the readers of the Journal with extracts relating to the old mines of the county. What is known of these mines to the general public is very limited, and the reports as to the wealth extracted from many of these mines are undoubtedly in many instances much exaggerated. Some half a dozen or more mines in the county are credited with having furnished Sir H. Middleton with the means to bring the New River to London whilst two or three adventuring miners from other districts, who are now represented by county magnates, are reported to have come into the county the porters of all their worldly goods contained in the compass of a single satchel. With regard to Sir Hugh I think it is generally admitted that he was a man of means when he came here, and I have heard it stated that it it very questionable, as far as any reliable records are obtainable, whether Sir Hugh did not leave the district a poorer man than he came. One thing is very certain, that Sir Hugh was not, unfortunately, able to finish the New River, and that between mortgages and concessions of shares or interest to the Crown and public bodies for assistance or privileges, was left a poor man. Can any of your readers say what amount dld Sir Hugh actually spend on the New River, and what proportion of that amount was obtained from the Cardiganshire mines? In other words, are there any authenticated accounts of Sir Hugh's mining speculations? If not, I should say that it is almost time we should lay the ghost of the oft-repeated tale of the wealth he obtained from our hills and bury it where poor Sir Hugh buried his money (wherever he got it from) in the bottom of the New River. As to the other old mining kings of the county, the Pughs, the Bonsalls, &c., there is no doubt but that they did derive large profits from mining, although it is very difficult in any instance to get at reliable accounts. There is one thing, however, which the historian of Cardiganshire mining of the present day can vouch for without much fear of contradiction—viz., that the descendants of these old mining kings, who inherit lands bought with the produce of mines held at nominal considerations, are the most exacting and greedy of all mining landlords, the Crown only excepted.

That there are many very ancient mines in Cardiganshire is beyond doubt, as is testified by the many old adits which are yet to be seen, and above all by the stone and wooden implements which have occasionally been found in old workings. Whether it is possible to fix the date of these old workings with any degree of certainty or not it would be an interesting subject, I think, for mining antiquaries to deal with. I know of several instances where day levels have been driven considerable distances through bare rocks by means of hammers und chisels, but I do not remember of any instances where sinking, except a few shallow pits here and there, has been effected by the same process. The old workings are, as a rule, locally called Roman, but most of them are undoubtedly of much later date. When a Mining Institute of Central Wales is formed—which, I presume, will be the case some day—it will no doubt be regretted that so many of these old mining landmarks have been obliterated by the ruthless hands of the modern miner, who with his wagons, his rails, and his boring machines wants a little more elbow room. One thing very striking about these old workings is the fact that wherever they are found the modern miner, by extending and deepening them, has almost invariably found a store of wealth. On the other hand, looking at the limited extent of these old workings, the low price of ore, expense of transit, and the slow progress of the excavations, and the centuries it took to execute them, it is difficult to believe that in any one generation a vast amount of wealth could have been extracted from them. Would it not be worth while to have a careful survey made of these old workings where they are still intact? In a few instances where I have come across any I have taken notes as correct of them as I could, and if others interested in mining would do the same, and have them deposited in some place of safety—say at Aberystwith College—they might be of some use to the student of Cardiganshire mining. RUSTICUS.

CARDIGANSHIRE MINES AND MINING

SIR,—It is much more easy to find fault than to praise, to doubt, than to be convinced—and whatever the work before you for consideration, if you cannot run it down, you at once confess your own inferiority. Such are the sentiments of many conceited people. Easy criticism! To praise is to lower yourself; to condemn is to show your own superiority. I was led into these reflections by a late perusal of a file of past Journals; but what, you will say, has this to do with Cardiganshire Mines and Mining? Why everything, to be sure. In the file before me, extending over a period of six months in the gloomy part of 1879, I find everything condemned in Cardiganshire—mines, mining management, and one mine acknowledged now to be a splendid property, and well and judiciously managed in every particular. I refer to the South Cambrian Mine, in which a grand discovery of silver-lead ore was made last week, and the starting of whose splendid field of machinery is so graphically described in last week's Journal by Capt. Absalom Francis and "Shareholder," accidentally present. This mine is described in the paper before me as one in which "ore sufficient to form a specimen" for the British Museum will never be found. A statement like this can now be laughed at and despised by a company sampling so many tons of silver-lead ore and blende as this company is doing from so short a working of their machinery; but what discouragement a statement

like this must have made at the dismal time I refer to. Green—how very green—the writer must have been to make such a statement; but at the time it passed for wisdom, because it condemned. The writer was for the moment the embodiment of knowledge. The promoters, the shareholders, the manager, and the captain were fools or worse. I wonder what the writer dating from Aberystwith thinks of himself now. If he reflects at all he must confess to being green—very green—and to have known as much about the subject on which he was writing as his own hat. I have many more examples before me, but I reserve them for a future communication.

EDWARD BEVAN.

Liverpool, Aug. 31.

MINING IN LLANARMON.

SIR,—This subject is daily attracting more attention, and the forces at work are becoming more powerful. I consider the most attractive influence is the Lady Ann Silver-Lead Mining Company. I have this week been favoured with an examination of a rough draft prospectus which is preparing for publication, and the directorate is composed of gentlemen of influence financially, and practical business capacity. The Chairman, I am informed, is the chairman of an association in Lancashire, representing a capital of over 3,000,000*l.* It has been suggested, and will most likely be adopted, that Capt. Absalom Francis, of the Gwern-y-Mynydd Lead Mines, be added to the directorate. The prospectus of the new company (limited) states amongst other matters that "the directors have the greatest confidence in recommending this company to the attention of lead mine investors, backed as they are by the reports and opinions of the mining engineers who are thoroughly acquainted with the capabilities of this lead producing district, some of whom have a practical acquaintance of the producing power of most of the mines from Mona, in Anglesea, to Minera, in Denbighshire, for over 40 years. . . . . The Lady Ann Mines immediately adjoin the Nant Mines, from which over 55,000*l.* worth of silver-lead ore was obtained in less than eight years' working and the lodes of the Nant run into and through this property in well defined positions, and are unworked." So that "the directors are determined to spare nothing to make this property the most valuable in the district, by attention, care, and economy in all the details of working." They will be aided by the ability of a well known mining and civil engineer of long standing in this district.

RESURGO.

Sept. 8.

LEAD MINING IN LLANARMON.

SIR,—There is an old saying that "nothing succeeds so well as success." I thank your North Wales Correspondent for his "hope" as to the future of the Lady Ann Mines. I consider it augurs well for anything in the mining line when your Correspondent expresses a sincere "hope" for success. He says, what I sincerely believe myself, that "there is no reason why the Lady Ann Mines should not prove every way worthy of that gentleman's ('Enquirer') hopes and enthusiasm." Very good. I think that is something gained. And in order, and as a further proof of my "hopes" and reason for "enthusiasm," I have the pleasure, with your kind permission, of sending you this week a copy of a report from Captain Absalom Francis, the agent of the Gwern-y-Mynydd Lead Mines, near Mold. I need say nothing of his ability and experience, as they are both acknowledged and recognised. I may here say that the work is progressing satisfactorily, though it may be slowly, at the level on the Westminster lode, and I expect another report on Wednesday next from the mine agent:—

Wrexham, July 13.—Complying with your request, I have now the pleasure of handing you my report of the Lady Ann Mines, situate at Llanarmon, and on the main lodes of the Westminster Mine. The mines in question have been famous in the production of lead deposits in my recollection, and it has been my pleasure to report on same on more than one occasion during its (the Westminster's) prosperity. The above facts leave me but little to say on its geological position. It is sufficient to say it is faultless, and embraces all the bearing strata, from coal in the east to the clay-slate in the west. Lady Ann is situated in the heart of these lead-producing channels, and contains over 400 yards in length of the Westminster main lodes, which are by some singular circumstances known to you as yet whole and undeveloped in your property. It is important to notice, also, that the main lodes in question up to your boundaries, both east and west, have been exceedingly rich and productive, which facts almost take Lady Ann out of the speculating list, and give it the importance of a sound investment.

The points of special interest are three in number—namely, (1) The Westminster lode, in the vicinity of your present workings, at the depth of 30 yards from surface has formed a junction with Francis lode, which has been found orey from this depth to nearly the surface. A level at this depth has been driven eastward from the shaft you have sunk on the Westminster lode just under the junction with that of Francis, which for the length driven contains unmistakeable indications of lead deposits, and has produced nice specimens of lead ore, and I look forward to a good discovery here shortly.—(2) The next point of interest is at your western boundary up to which a fine run of ore in one of the main lodes has been worked. A whim-shaft has been sunk to the depth of 50 yards near to the above run with the object of working it, from which a cross-cut was driven south intersecting the main lodes and nearly far enough to cut the Pant-y-Gwlanod lode. It appears, however, that the one selected to drive west upon and win the ore run in question was the wrong one, and they failed to find what is known to exist, probably through the want of correct diallings, to do which, and to extend the cross-cut in question to the Pant-y-Gwlanod lode a very small outlay is required, which in my opinion cannot fail to be fruitful in results. What has been done is all in the right direction, and will save a considerable expenditure in attaining the above objects.—(3) The third and most important point is the development of the celebrated Pant-y-Gwlanod lode at the eastern portion of your boundary, where a shaft has been sunk to the depth of 45 yards which has entered the lode in question, but strange to say only a few yards have been driven upon it to the west. The level should be continued, which will not only gain considerable backs in that direction, but come in contact with a tribe of feeders and oblique joints known to exist, and which in my opinion cannot fail to produce rich ore deposits at their junctions. A cross-cut from the above level will also make available the ore runs in the side lodes on the north at a good depth by reason of the rapid rise of the hill in that direction. In conclusion I must congratulate you upon possessing in Lady Ann a property sufficiently extensive on the main lodes in the very pick of positions, and one in which a small outlay cannot fail, in my opinion, to develope into a rich and lasting mine.—ABSALOM FRANCIS.

It is probable that the Lady Ann Silver Lead Mining Company (Limited), from the interest there is now attaching to it, will, as I have before said respecting the property, become one of the prizes in lead mining in Llanarmon in this year of our Lord, far as it has already advanced, and investors desiring to join a good sound undertaking should make early applications for shares.—*Sept.* 6,

ENQUIRER.

[For remainder of Original Correspondence see this day's Journal.]

FOREIGN MINING AND METALLURGY.

Stocks of coal in the principal French towns are being either reinforced or completed. The warehouses in the neighbourhood of canals are also being progressively filled. Arrivals continue regularly, and merchants appear to be determined not to allow themselves to be surprised by severe winter weather, as was the case last year. The aggregate production of coal in the principal French basins in the first half of this year is returned as follows:—Nord and Pas-de-Calais, 3,935,512 tons; Loire, 1,772,775 tons; Alais, 1,007,221 tons; Creusot and Blanzy, 565,769 tons; Commentry, 400,632 tons; Auben, 332,618 tons; Carmaux, 151,270 tons; Brassac, 120,289 tons; and Graissessac, 114,150 tons. Sixteen other basins produced from 10,000 tons to 100,000 tons each, 13 others from 1000 tons to 10,000 tons each, and finally three basins of very limited importance produced less than 1000 tons each. The total production amounted to 9,120,414 tons, of which much more than three-fourths were furnished by the first five basins. As regards lignites the only production of any importance was effected in the Aix basin, which yielded 230,028 tons As compared with the second half of 1879, the total production of coal in France to June 30 this year presented an increase of 617,643 tons.

A recent adjudication for locomotives, tenders, axles, &c., has communicated rather a depressed tone to the Belgian iron trade. Prices have, however, only varied very slightly. There seems little cause for the drooping tendency in affairs, except, perhaps, that prices have come slightly lower from Glasgow. This is, however, after all, not a real or satisfactory explanation, since the Belgian iron trade is not controlled absolutely by the markets of Scotland and England. Plates have fluctuated in Belgium between 6*l.* 16s. and 7*l.* 4s. per ton. In addition to contracts recently let for 50 locomotives for the Belgian State Railways, the Belgian Minister of Public Works proposes to order 45 more locomotives and 1000 more trucks, The construction of this additional plant will afford a large amount of employment for some time to come, and will probably enable the Belgian State Railways to cope with all eventualities in the matter of traffic. Contracts will be let on the 15th instant for 70 turntables. The production of iron minerals in 1879 in the province of Luxembourg was 105,422 tons. The Athus blast furnaces produced last year 53,700 tons of pig, as compared with 55,763 tons in 1877, and 52,000 tons in 1877.

Prices for iron have been supported with a tolerable amount of firmness in France. Merchants' iron has especially revived, considerable re-assortments having been laid in. Concessions in regard to prices appear to be out of the question in connection with new orders. Merchants' iron is quoted at 7*l.* 12s. per ton, and plates at 10*l.* 8s. per ton. The production of pig in France in the first half of this year was 847,335 tons, as compared with 687,187 tons in the second half of 1879. Of the pig produced in the first half of this year only 138,526 tons were casting pig. The production of Bessemer or Siemens' steel in the first half of this year was 183,173 tons, of which 135,827 tons were rails. The production of steel in the first half of this year showed an increase of 13,205 tons, as compared with the second half of 1879. The aggregate production of rails, merchants' iron, and plates in the first half of this year was 489,320 tons, as compared with 446,435 tons in the second half of 1879. The German iron trade has continued to present a good tone. Various products of the blast-furnaces have experienced a partial advance; this rise has been accepted by consumers, and has even been followed by further orders. It is expected that rolled iron will follow the course of the pig-iron trade.

REPORT FROM CORNWALL.

Sept. 9.—The announcement of a drop of 4*l.* in the standards is anything but cheering, and perhaps, on the whole, is more discouraging than was to have been expected; not that we are at all inclined to overrate its importance. It will afford a pretext—indeed, we may fairly say a cause—for a rapid fall in shares (following as it does the reduction of last week), which will enable the wide awake to buy in, and then when the not distant see-saw comes realise handsome profits. This sort of thing has been repeated so often of late that it is very easy to forecast. If the market were free such a movement would have a far more serious significance.

Of much more importance than such a fall in prices to the permanent interests of tin mining is the trial this week by the Polytechnic judges of the new pulveriser of Messrs. F. W. Michell and Tregoning at Wheal Peevor. As we explained last week, it is simplicity itself—merely a rotating barrel, with a quantity of scrap iron ("boiler punching" in this case) rolling round therein as grinding or rubbing material, through which the burnt leavings treated are carried by the agency of water. The Polytechnic judges felt that such an apparatus could only be fairly judged in actual working, and accordingly arranged for its inspection at Wheal Peevor, where it was seen in operation on Monday last by Messrs. W. Husband, J. Hocking, jun., N. Sara, J. Poole, W. M. Grylls, and Capt. John Hosking. The test in every way was of the fullest and severest kind. The stuff was sampled before it went into the machine, and as taken from the buddle into which it was discharged, and proof thus given that the work was thoroughly done, and that no re-treatment was necessary. The speed was also tested, and the amount of power required to drive the apparatus. One of the most singular and accidental features of this pulveriser is that, while in the grinding pulverisers worthless sand has to be ground equally with the stanniferous matter, here by the action of gravity coming into play the lighter particles are at once ejected. For example, a quantity of fine coal fed in at the suggestion of Mr. Husband was thrown out again in just the same state. Expressing their opinion that in this apparatus—so simple, cheap, and effective—we have one of the most valuable mining improvements of recent times the judges awarded the first silver medal. The trials were witnessed by several other gentlemen, including Capt. Nicholas (West Basset), Capt. White (Wheal Peevor), J. Pryor (Wheal Prussia), T. Pryor, &c.

No wonder that uncertainty is felt as to the course of the tin trade by outsiders and the general public when such doctors disagree as Capt. Teague and Capt. Boyns. We do not intend to enter into the "bull" and "bear" controversy more than to say that the market would be in a much more healthy state if both these classes of operators could only be induced to let it alone and spend their energies in legitimate business instead of in abusing each other. This at any rate, however, is clear, Cornwall is more indebted to those who endeavour to keep prices up—if the market cannot be left to take its own natural course—than to those whose efforts are directed to pull it down. Capt Teague believes, as he always has believed (and through the darkest times of the depression in the pluckiest manner acted upon that belief), that tin will command higher prices, though he does not expect an early advance. He does not think that there is very much to fear with regard to the future of tin, and holds that the hopes of tin producers will be realised, but not yet. Thus for Carn Brea. Capt. Boyns at Wheal Owles, speaking as the oldest mine agent in Cornwall, and on behalf of a mine with which he has been associated 46 years, looked upon the recent drop as attributable to the dull times and the holidays, and anticipates that tin will be up to 70*l.* a ton before his next meeting. The difference between Capt. Teague and Capt. Boyns is not as to their faith, but as to when that faith is to be realised—a very important point in times of uncertainty and struggle—and upon the whole we are inclined to take the more immediately hopeful view, though perhaps Capt. Boyns is a little sanguine as to the actual figure he forecasts.

A very important remark was made by Capt. Teague, to the effect that 50*l.* a ton for tin was no good to the mines, with the exception of one or two, and that those who could do with it were exhausting their reserves. Capt. Teague is so high an authority on all practical points that it savours very much of temerity to join issue with him on such a statement. It seems to us, however, that in making it he has not sufficiently allowed for the changed conditions of the past few years; 50*l.* a ton now means a very different thing from what it did half a dozen years since, and still more from what it did nine or ten. Then we should unhesitatingly have agreed with him. Now so great have been the economies and improvements effected, for the most part under the pressure of evil times—so great have been the reductions in cost of important classes of materials—that 50*l.* is a much more substantial figure than it was, and quite enough, if not for the realisation of large profits (which it certainly is not), to keep mining afloat: 65*l.* or so, however, would put matters upon a very fair footing, and that we do not think it at all too much to expect. Far better a moderate figure and steady, than a high one and fluctuating.

The remark about reserves seems to require a word of comment, for neither in that matter are we where we were a few days since. The reserves of a mine are, of course, the ore ground which has been laid open and remains unworked. Beyond that we have the portions of the lodes which are yet to be opened upon, and which are liable to a considerable amount of uncertainty, though in a good mine they, too, have a fairly estimable value, and are to a well defined extent in the nature of reserves, reserves of the second degree, though not so classed. Now, when it was said under the old style of hand driving and sinking that the reserves of a mine were being taken away it was a very serious matter, for it was impossible to open up the ore ground at more than a certain rate, and it was very easily possible that this should be overtaken by the extraction of the mineral. The permanence of a mine always depends upon exploration and the opening up of new ground, keeping ahead of actual mining operations connected with the raising of the ore; and if the reserves of our mines were being exhausted—if they lived from hand-to-mouth as it were—even a temporary falling off in productiveness might bring them to a standstill. In this department, however, an enormous change has been introduced by the boring machines. Explorations can be carried on much more rapidly, and ore ground laid open with far greater speed, than hand labour could effect. This places our reserves in a very different position, and enables our miners to return an amount of mineral with perfect ease and safety which in the old time would have been utterly impossible. The introduction of machine boring has, in fact, extended practically the reserves of our established mines far beyond the existing capacities for exhausting them, and hence we look more hopefully upon this point also than does Capt. Teague. Of course where there are mines which do not avail themselves of these improvements in machinery and operations that no doubt the evil that Capt. Teague deprecates exists, but even then it is not necessary.

Some amount of misapprehension appears current with regard to the report of the Explosives Committee. It is not and never was intended to be exhaustive, except of the two series of trials sets forth. With very limited means the working members of the committee have discharged a difficult and onerous task to the best of their ability, and so far as ther means would permit. Given further means the inquiry could be carried further, but the Committee were clearly wise in not undertaking more than could be properly done, rather than endeavouring to cover more ground than their means permitted. One thing done well is better than half-a-dozen done ill or half done, which is much the same.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Sept. 9.—Upon 'Change yesterday and to-day the trade outlook was of an encouraging character. During the week Mr. J. H. Pearson, of Windmill End, Dudley, has put in one blast furnace, making three going, and Messrs. J. and T. Williams, Parkfield, Wolverhampton, are relighting two furnaces. This increased production is going on notwithstanding that pigs are already plentiful, and a good order might to-day without much difficulty have been placed at prices below quotations, which were for hematites 4*l.*; for native all-mine pigs, from 3*l.* 10s. to 3*l.* 12s. 6d.; and for cinder pigs, 2*l.* 2s. 6d.

There are few finished iron firms who are not able to report themselves with a fair amount of work in hand. Some bar and hoop firms, indeed, report that they can see three months ahead. The price of medium bars ranges between 6*l.* 10s. to 7*l.*, and a splendid quality is offered at 7*l.* 10s. Hoops are 6*l.* 15s. to 7*l.* The demand for boiler plates is a little better at 9*l.* 10s. to 9*l.* for good qualities. The sheet makers are the firms that are doing most. These continue very active, and have no difficulty in getting all the specifications needed. "Singles" were quoted 7*l.* 15s. to 8*l.* The galvanisers in the roofing department are mostly busy; indeed, firms whose brands are in repute in the market where there is most buying are pressed with work, and by reason of their inability to complete the orders in the stipulated time have been this week compelled to refuse orders representing very many tons.

The number of blast furnaces built in South Staffordshire is shown by a return just published to be 146. The proportion idle is very much less than it was a year ago, when only 26 furnaces were in operation. It is stated that several of the furnaces have not been lighted up for over 10 years, and in one instance 20 years is given as the period of idleness. About 40 furnaces have been dismantled within the 20 years.

The strike of colliers in the Silverdale district of North Staffordshire has been short lived. After being out not quite a fortnight the men have returned to work on the old terms. The men have had no cohesion in the struggle, but have been, in fact, gradually going back to work since the strike began.

TRADE OF THE TYNE AND WEAR.

Sept. 9.—The Coal Trade is quiet, yet shipments have gone on very steadily during the week, and the business in steam coal has been fairly good. Shipments of coke also continue on a satisfactory scale. The best gas coal trade is firm, but second-class pits in Durham are only moderately employed. The demand for house coal continues moderate, but the season is now approaching when this branch of the trade may be expected to improve. Full employment at the Durham collieries is, however, dependent on a further improvement in the iron trade, and at present upwards of 50 furnaces are still out in Durham and the Cleveland district. As we remarked last week, the demand for Durham coke on the West Coast and in the Midland district is improving.

With respect to the question of the deputies' wages in Durham, now under the consideration of the Durham Coalowners' Association, the Chairman of that Association states that they have not refused arbitration in the question, and it is probable that the dispute will ultimately be settled in that way.

The Iron Trade has been very quiet during the week, with little change in the demand, and prices have been nearly stationary. No. 3 pig-iron remains at 42s. The monthly returns of the Cleveland ironmasters being rather less favourable than the previous month has had the effect of slightly weakening prices, and the approaching close of the Glasgow strike may have the result of causing a decline. The returns of the Cleveland ironmasters for the month of August show that there are 115 furnaces in operation and 51 furnaces damped down, or a total of 165 built. In August last year there were only 79 blowing; the statistics show a considerable increase in make, as might be expected, as three furnaces have been lighted since the end of July. Stocks are also much heavier—16,269 tons; but this is accounted for by the fact that the ironworks were laid off a fortnight for holidays, and the blast-furnaces kept going. The shipments have also been much lesss than during July, and this has caused the accumulation of stock. On the whole, the returns are considered to be favourable. The make in Cleveland for the month was 168,682 tons.

We noticed lately the extraordinary success of the Consett Iron Company. The most important make there is iron ship-plates; the production of those plates has been recently raised, and it is now the largest of any plate-producing works in the world. The company is also preparing to manufacture steel plates, and they are for that purpose erecting a Siemens plant. From its connection with the iron ore trade of Spain, and its command of hematite iron ore, the facility for the production of iron and steel plates here is most admirable, and it is on this, and on the manufacture of coke, that its enormous earnings depend. A large order for hydraulic cranes for the North-Eastern Railway Company has been received by Sir William Armstrong and Co. The cranes are to be placed on the quays of the new docks at Hartlepool.

At Middlesborough, on Tuesday, there was a good attendance, and an improved tone pervaded the market, there being more enquirers. The stock of Messrs. Connall is 93,501 tons; quotations, 42s., No. 3. The shipments of pig-iron last week improved considerably; about 19,000 tons, and also a larger delivery of manufactured iron and steel. The quantity of iron on hand in the district is not large considering the make being equal to about six weeks' make—273,376 tons; 112,000 tons of this is in warrant stores. There is expected to be a large increase in the shipments of iron, both pig and manufactured, during the present month, and so far shipments have been good. The manufactured iron trade is steady. There has been more enquiry, but not a great number of new orders. Plate makers have been especially brisk. Ship launches are frequent, but there is no lack of orders. Prices are—ship-plates, 6*l.* 12s. 6d.; bars, 5*l.* 15s.; puddled bars, 3*l.* 15s. Coal is quiet Coke in better demand for shipment.

THE MINERS AND THE UNIVERSITY EXTENSION SCHEME.—The arrangements for the purpose of adapting the University lecture system to the mining districts of Northumberland are now about to be completed. On Saturday a meeting of deputations was held in the Mechanics' Institute, Seaton Delaval, under the presidency of the Rev. E. Short, vicar of Woodhouse, for the purpose of promoting the object. After some discussion it was resolved that the following places be adopted as centres:—Blyth, Chippington, Backworth, Seaton Deleval, and North Seaton; the two latter places, however, to be subject to further consideration. Mr. Moorsum has been engaged as lecturer, and the subject of the first course is "Political Economy." In the colliery districts in Durham lectures on this subject have been already delivered by Mr. Lloyd Jones, and no doubt others will follow.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS—COAL IN INDIA.—At the meeting of members on Saturday (Mr. J. W. Weeks, Bedlington, in the chair), a very interesting paper was read on the Coal Fields in India by Dr. Saise, F.G.S., assistant manager of the East Indian Collieries. The writer remarked that only two coal fields have hitherto been opened out by railway communication—the Ranegunge and the Kushurballee fields. The Kushurballee field is situated 200 miles from Calcutta, and possesses an area of eight square miles of productive coal measures, five of which belong to the East Indian Railway Company, the rest of the field being divided amongst other coal companies. The geological structure of the field was explained and illustrated by elaborate maps and sections. Some

of the seams are 20 ft. in thickness. It is estimated that the field contains 82,000,000 tons of workable coal, The output is about 450,000 tons per annum. The duration of the field is estimated at 162 years. The physical and chemical structure of the coal was dwelt upon at some length, and specimens of coals and tables of analysis were shown. The large amount of fixed carbon was specially mentioned to prove that the coals are good for steam purposes. The small amount of sulphur was also noticed. Those coals are more valuable than the coals generally found in India. The coals are used chiefly by the East Indian and other railways. The age of the coal measure is Triassic, or of later age than the English coal measures. Men, women, and children are employed in these mines. The price paid for cutting coal varies from 1s. to 1s. 6d. per ton for large and 4½d. for small; daymen receive from 3d. to 4d. per day; payment is made on Sunday mornings. Mining is only carried on from November to June, the men being employed in land cultivation during the rainy season. Some interesting plates and photographs of natives were shown. A cordial vote of thanks was passed to Dr. Saise for his valuable paper. Professor Marreco afterwards exhibited specimens of luminous paint to the members in the laboratory of the College of Physical Science.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Sept. 9.—The inquest on the accident at Benham Colliery, which took place on Aug. 3, was concluded on Tuesday. The jury gave a verdict to the effect that the eight men were killed by an explosion of gas, the result of a shot fired in William Hughes "face," which caused an ignition of gas. The Government Inspector, Mr. Hall, and the Assistant Inspector, Mr. Hedley, and several local mining engineers were present at the inquest. The enquiry has elicited the opinions of the above gentlemen as to the cause of the explosion. These of course are valuable in themselves, and it is to be hoped that the suggestions of the assistant inspector will receive the careful attention they deserve, and that colliery managers and others will not allow this occasion to pass by and be forgotten without first having taken to themselves the lessons it teaches. The explosion was indirectly caused by the firing of a shot. The evidence of several of the witnesses showed that "blowers" were frequently met with, and as Mr. Hedley said at the inquest, "the question naturally arises whether in a seam of this character it is safe to fire shots at all. I am strongly of opinion that shots should not be fired at any time when these "blowers" are perceptible, and that under any circumstances gunpowder should only be used when the men ordinarily employed in the mine are out of the mine. If it is held that the mine cannot be worked under these principles I may say that the principle is now being carried out in a number of fiery mines in Lancashire." Mr. Hedley speaks in plain unmistakeable language, and it would be well if all those whom it concerns would take his timely suggestions to heart and profit by them. This of course applies to both masters and men, for amongst the latter especially the persistent clinging to old fashioned and as in this case dangerous systems of mining is difficult to destroy.

The Slate and Coal Trade continues dull and depressed, and it is to be hoped that the hopes for a further revival of trade, mentioned in the speech from the Throne, will soon be realised. The Cambrian Railway, of which mentioned was made last week, is the line over which most of the mineral traffic of Cardiganshire, Merionethshire, and Montgomeryshire passes, and with the improvement in its financial arrangements an improvement, or rather an increase of facilities for its mineral and passenger traffic, may, it is hoped, be expected.

A committee is being formed by which the Eisteddfod—that is, the National Welsh Eisteddfod—is to be regulated in future. Its first meeting will take place in Shrewsbury on the 17th, and its duties when formed will be to place and keep the Eisteddfod meetings on a firm and permanent footing, aud to govern, specify, and distribute the prizes which year by year have proved so efficacious in urging the people to attain more knowledgde and skill in both the arts and manufactures which relate especially to Wales. The yearly meetings will be held in North and South Wales alternately, and it is to be hoped that the frequent local Eisteddfods will be so arranged as not to class with the national meeting.

REPORT FROM FOREST OF DEAN.

Sept. 9.—Considering local circumstances, the coal trade is not inactive, although it is our duty to remember that the trade has become of late years much more circumscribed as to the number of collieries in development; and although our views of local trade have been, in the estimation of some, too inelastic and deficient of buoyancy, it is a matter of self-congratulation to find that our views were fully vindicated by the post-prandial deliverance of the Crown Receiver at the late audit at the Speech House. It is far from pleasant to testify to unwelcome facts or truths, but candid utterances should be encouraged nevertheless. To prophesy smooth things when the opposite prevails around us may be acceptable to some for a time; but a rebound will come, and then it will be seen and felt that honesty is the best policy in the long run. From various causes, some local and some general, the Forest has been in a state of commercial affliction; and when it will fully emerge from the pressure of circumstances alluded to it is not possible at present to predict. It is pleasant, however, to recognise some indications of improvement. At some of the collieries trade is more active, but at others comparative dullness prevails still. The hardware trades appear somewhat more hopeful, but they are by no means what we should like to see them. Mr. Francis (Crown Receiver), at the Gale dinner, stated that the only trade in the Forest which could be said to have improved, so far as he was aware, was in the quarry department. Of course he meant improvement worthy of special recognition; for there are variations, improvements, and otherwise which correspondents may notice, but not deemed of sufficient importance to be recognised by Crown officials.

And in passing we may mention some present improvement not only in black coal at some of the collieries, but also (at others) a better demand for lime and smiths' coal. Some of the causes of local slackness and deterrent as to mining adventures in the Forest were incidentally alluded to by the speakers at the Gale dinner, Mr. Francis emphasising his opinions of Free Miners' rights as standing in the way of local adventure, but did not lucidly point out in what way or in what respects their rights were prejudicial; but there can be no doubt but that the great increase of local taxation is a serious obstacle to progress. Like some others, he would like to shift the education and highway rates upon imperial taxation. The education burden would be less felt if thus sustained, and as to the highway expense, that, in our opinion, should be met either by toll-gates or from the taxes on horses and carriages. Such matters appear to some quite foreign to questions of trade; but as miners, or minerals, are assessed for rates for purposes of public expenditure, and all expenses involved in carrying on trade must be met out of the trade, and, therefore, the gentlemen at the Gale dinner were quite within the principles of trade in discussing the public burdens to be borne by them in carrying on business. Mr. Francis hoped that Mr. Gladstone would take the questions mooted in hand—but his doing so is quite problematical, in our estimation. But it is certain that they must be dealt with, and if dealt with wisely and effectually we are certain that hindrances to trade will be thereby removed, and that a new era of Forest improvement and prosperity will be introduced. In some future report we may more definitely discuss some of the points little more than raised in our present communication.

REPORT FROM DERBYSHIRE AND YORKSHIRE

Sept. 9.—Business in the mining districts of Derbyshire is still particularly quiet. The production of lead is of an average amount, but just now there is a movement on foot for opening out many places that have no direct communication by means of a junction with the Midland line. One of the great drawbacks to the development of the mineral wealth of the Peak has been the want of railway facilities, and this it is now expected will be remedied by a line in which Castleton, Eyam, Hassop, and some other places will be brought into direct communication with the main system of the Midland. In the Northern part of the county the iron trade is still in a healthy state, there being a steady output of pig, with a fair demand, and late rates are fully maintained. In manufactured iron there is nothing in the shape of activity, although merchant iron has of late sold rather freely. At the steel rail works at Dronfield there has been a heavy production, and prices have gone up in consequence of the orders that have been placed, and the increase in the price of hematite pig. The coal trade is still quiet, and colliery owners are unable to get prices that will keep them from an actual loss. This is more particularly the case with respect to house coal, most of the markets being completely glutted. Steam coal, however, is in better request, and coke has sold rather freely.

In Sheffield the trade, taken altogether, is good, but of course there are some branches better off than others. Very little is being done in armour plates, this important trade being in a state of transition, as the Government has not decided upon the composite plate which will in the future be adopted for the sheathing of our war vessels. The Bessemer rail works are busy, and prices, which a couple of months ago were from 5*l.* 10s. to 5*l.* 15s, have now gone up to fully 7*l.* Crucible steel makers are not quite so busy as they have been, and the orders that some time since were given for the bridge acro ☧ the Forth have been withdrawn, for the present at least. America continues to send good orders for cutlery and other hardware as well as for steel, whilst a steady business continues to be done with Australia and other of our colonies. The mills have been running well in ordinary plates, sheets, and wires, and there has been a fair production of hoop and bar iron.

The Coal Trade of South Yorkshire was scarcely ever in a worse state than it is at the present time. Colliery owners are working at a loss, and miners' wages are exceptionally low, and notices have been given at several places that a reduction must be made if the collieries are to be kept going. At one of the largest collieries in the district the men, to the number of nearly 700, have been discharged, for no other reason than that to carry on simply means the loss of so much money weekly. The trade with the Metropolis is still quiet and unremunerative.

On Wednesday your correspondent, Mr. Thompson, of London, visited Barnsley, in connection with his scheme for taking coal from South Yorkshire to London and Paris *via* the Great Northern Railway and Boston Deeps. He was favourably received by the Mayor of the town, as well as by some of the leading colliery owners and other gentlemen connected with the mining interest of the district. The present time for carrying out the scheme is certainly most opportune, and it is to be hoped that Mr. Thompson and those acting with him will lose no time in carrying it into practice.

DEPHOSPHORISATION OF IRON.

The statement made in connection with the Düsseldorf meeting of the Iron and Steel Institute, to the effect that the direct basic or lime process for dephosphorising in the manufacture of steel, has not fulfilled the anticipations formed of it, or only at a cost of waste by oxidation which neutralises the saving—an opinion which is entertained by a large number of practical iron manufacturers—has called forth a detailed reply from Mr. S. G. Thomas, one of the patentees, who says:—"The vital importance of this subject of dephosphorising to the greatest of our national industries induces me to hope you will, with your customary fairness, allow me to make a short statement of facts, since continental ironmasters, by the intelligence and well-directed energy with which they have adopted the new process, have already gained a lead over their English rivals which it will not be easy for the latter to recover. It is now barely 18 months since it was announced that the problem of dephosphorising had been solved, and that experiments conclusively proving this had been carried out at Bolckow, Vaughan, and Co.'s works. In this short interval Messrs. Bolckow, Vaughan, and Co. have so entirely satisfied themselves of the commercial and technical success of the new process as to have erected the largest Bessemer plant in the kingdom solely to carry it out with suitable appliances.

The progress abroad is especially remarkable. In the past 12 months alone the process has been adopted by and is now in daily constant operation at ten of the leading steelworks in Europe; tens of thousands of tons have been made by its means and have gone into current consumption in the shape of rails, tyres, sleepers, plates, wires, rivets, &c. Many other works have finally decided on its adoption, and are making the preparations necessary for this purpose. Perhaps even more important and significant is the fact that there are now in course of actual erection, under my licence abroad for this process, new Bessemer works having an initial aggregate capacity of over 600,000 tons a year. In each case the heavy expenditure necessary for the erection of Bessemer works has only been decided on after a prolonged investigation of the technical working of the process at one of the works in which it is already in operation. As to the extra waste by oxidation absorbing the saving, no suggestion could be more at variance with the facts. The figures quoted at the Düsseldorf meeting showed that with the imperfect and unsuitable plant at present used the average waste in dephosphorising is under 16 per cent. (being in some cases under 12 per cent.)

In the ordinary Bessemer operation the waste exceeds on an average 12½ per cent. We may take an average price of 80s. a ton for hematite pig in Sheffield and 50s. a ton for phosphoric pig in the same place. Now, a waste of 12½ per cent. on pig at 80s. costs 10s. per ton, while a waste of 16 per cent. on pig at 55s. costs only 8s. 9d. In other words, so far from the extra waste (which, indeed, we believe to be only a transient and local defect) absorbing the saving, it actually adds from 1s. to 2s. a ton to that saving. As it seems agreed on all sides that puddled iron must inevitably give way to ingot iron or steel in every department, it seems hardly desirable that England should be behindhand in preparing for an inevitable change, when Germany, France, America, Belgium, and even Russia are vigorously accommodating themselves to the situation.

Registration of New Companies.

The following joint stock companies have been duly registered:—

THE SINCRUSTA-WALTON COMPANY (Limited).—Capital 100,000*l.*, in shares of 10*l.* To manufacture, trade, and deal in wall hangings and decorations, book-covers, and other fabrics. The subscribers are—F. Walton, Twickenham, 5; G. W. Pollexfen, Sunbury-on-Thames, 1; W. H. Whinfield, Fairleigh, Shipperton, 1; J. W. Whin ield, Fairleigh Shipperton, 1; J. Fretwell, 7, Poultry, 5; J. Naylor, 7, Poultry, 5; J. R. Whitley, 7, Poultry, 5.

THE WEST LONDON HOUSE AND LAND COMPANY (Limited).—Capital 50,000*l.*, in shares of 5*l.* To carry on in the metropolitan postal circuit the business of a building and land company in all branches. The subscribers are—J. Short, 10, Kensington Park-road, 60; W. J. Spratly, Notting Hill, 25; J. L. Sherrin, 7, Lancaster-place, 40; R Scoles, 5, Ladbroke-grove, 25; O. Owens, Shepherd's Bush, 5; A. B. Holt, 66, Stowe-road, 5; J. T. Burt, Shepherd's Bush, 5.

THE BEER FREESTONE AND LIME COMPANY (Limited).—Capital 18,000*l.*, in shares of 1*l.* To purchase certain quarries and works situate at Beer, together with all cranes, plant, machinery, &c., for the purpose of carrying on the business of quarrying in all branches. The subscribers (who take one share each) are—S. Ward, Exeter; J. Smith, Exeter; H. D. Thomas, Exeter; R. H. Ward, Exeter; E. Fenings, Exeter; A. W. Oakley, Exeter; H. Ford, Branscombe.

The GENERAL MOTOR COMPANY (Limited).—Capital 100,070*l.*, in shares of 10*l.* To acquire different patents in connection with the manufacture of a spring motor, applicable to various purposes, and to carry on such business. The subscribers (who take one share each) are—J. Leveaux, Teddington; A. M. Leveaux, Hampton Wick; J. T. Copeland, Penge; A. Aylard, Little Ilford; E. M. Pigram, 30, Tollington Park; T. Sissons, East Dulwich, J. Bowden, Canonbury.

THE NATIONAL LIBERAL LAND COMPANY (Limited).—Capital 100,000*l.*, in shares of 5*l.* To carry on the business of a land company, and the procuring of the enfranchisement of the copyhold. The subscribers (who take one share each) are J. Beal, 20, Regent-street; W. Woodall, Burslem; B. Whitworth, 11, Holland Park-road; J. E. T. Rogers, Oxford; A. T. Hawkins, 2, Dowgate-hill; W. H. Corfield, 10, Bolton-row; J. C. Durant, 265, Strand.

THE STANLEY LAND AND BRICK COMPANY (Limited).—Capital 20,000*l.*, in shares of 100*l.* To acquire lands near Liverpool, and to carry on the business of a land company, together with the manufacture and sale of bricks, tiles, pipes, &c. The subscribers are—J. Wethered, Clifton, 59; E. Filder, Liverpool, 29; A. H. Holme, Liverpool, 19; J. L. Hedley, Chester, 10; E. B. Wethered, Bath, 1; W. Filder, Liverpool, 1; F. U. Holme, Liverpool, 1.

THE CITY OF SANTOS IMPROVEMENTS COMPANY (Limited).—Capital 120,000*l.*, in shares of 10*l.* Carrying into effect a concession for supplying the City of Santos, Brazil, with gas and water. Also to construct, maintain, and work tramways there and in the neighbourhood, and generally to carry on the business of a gas and water works company. The subscribers are—J. F. Russell, 9, Leinster-square, 25; E. Griggs, Finchley, 25; E. J. Halsey, 77, Cornhill, 25; A. Mumball, 1, Victoria-street, 25; M. H. Moses, 134, Westbury-terrace, 25; D. M. Fox, Torquay, 25; N. Millpoint, 9, Bury-court 10.

THE WEST RIDING TRAMWAYS COMPANY (Limited).—Capital 50,000*l.*, in shares of 10*l.* To construct, maintain, and work tramways in Yorkshire. The subscribers are—C. Walker, Dewsbury, 20; J. Hart, Dewsbury, 10; G. Trussell, Batley, 20; C. W. Brice, Dewsbury, 10; B. Alderson, Cleckheaton, 10; G. Sellers, Bristol, 10; G. Clay, Dewsbury, 10.

THE WILLASTON MILLS COMPANY (Limited).—Capital 15,000*l.*, in shares of 25*l.* The purchase of the Willaston Mill, Cheshire, along with the machinery, plant, goodwill, &c., and carrying on there and elsewhere the business in all branches of millers. The subscribers are—S. L. Radford, Willaston, 120; J. Charlton, Dumfries, 20; W. A. P. Walker, Bingley, 10; A. Cameron, Helsby, 10; S. C. Radford, Liverpool, 8; J. R. Welch, Liverpool, 5; W. R. Parkinson, Liverpool, 5; J. Pool, Dumfries, 5.

NEW ZEALAND LAND CORPORATION (Limited).—Capital 110,000*l.*, in shares of 10*l.* and 1*l.* To acquire any land in New Zealand, to improve same, and to carry on the business of a colonial land company in all branches. The subscribers (who take one share each) are—E. J. Charter, 11, Hogarth-road; T. J. Horrocks, 17, Philpot-lane; A. O. Rumball, 106, Inverness-terrace; H. Fleet, South Hackney; E. Leworthy, 13, Finchley-road; C. W. Kirk, 148, St. Paul's-road; J. W. Tricker, Croydon.

THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE.—Capt. N. C. Morcom, June 11: Winzes: In the winze sinking below the 12 there are indications of a change about to take place for the better. The lode matter is increasing, and stones of black metal are being met with. The ground is also a little easier; I, therefore, look for better progress in sinking in future. The stopes in the back of the 12 continue much as usual. The cross-cut west at San Juan is still in lode matter spotted with green ore. We shall commence to open on the ore driven through next week.

June 18: The winze sinking below the 12 has not undergone any particular change during the past week, with the exception that the water has increased a little. It has reached a depth of 36 ft. and continues to be valueless. There has from time to time been a sign of metal showing itself in the east side of the winze during the sinking, which leads us to hope there may be a part of the lode yet standing there of value. The lode being about 20 ft. wide, and the winze situated on the western wall, has induced us to suspend the sinking for a while, and to put out a cross-cut east, to prove whether the ore exists in that direction or not. A very short time will prove this satisfactorily. A full report will be sent you next week on the different points of operation, where at present there are no changes to speak of, with the exception of the back stope in the 12 Mina Grande becoming less productive.

July 2: The cross-cut driving east from the winze sinking below the 12 has met with more lode matter and metal than the winze contained, but not in sufficient quantities to be of any value. It appears to be evident from the operations already carried out at this point that we have come across a part of the lode which is of an unproductive character. Continued exploratory works carried on with vigour will alone reveal what is in future for us. There has no change taken place of any importance in the stopes in the back of the 12; the same may be said of the big black ore stope below tunnel level. At present we are engaged in San Juan in taking down the sides of the level we drove across the lode. It is still productive of green ore in paying quantities.

July 16: The cross-cut east at the bottom of the winze sunk below the 12 has been driven through the lode 16 ft. 9 in., the width of the winze included. We have come in contact with the east wall, but without finding metal of any value. There were occasional stones of ore met with in the cross-cut, and more quartz and less felspar than in the winze; still it failed to produce metal of any account, and shows too clearly a poor part of the lode. I attribute the poverty of the lode at this point to the greatly increased amount of felspar which is not seen elsewhere. In sinking the winze we always had better indications at the south end than the north; we shall now start to drive south—*i.e.*, towards the 15 workings, and hope to find something better than the winze produced. The stopes in the back of the 12 are yielding a good supply of metal. The stope below tunnel, called the big black ore stope, is still very productive; this stope cannot be of long duration as we have reached the bottom of the tunnel within 3 ft., and are carrying all the metal before us as we proceed northward. In the San Juan the taking down of the sides of the cross-cut driven through the lode have given us a large quantity of docile metal, also some fine stones of galena and black copper ore; this point has now an excavation of 25 ft. long, 17 ft. wide, and 7 ft. high. The stope in the back is looking well, and is very productive; what is in store for us here is difficult to predict. Notwithstanding I consider the prospect to be a very cheering one. You will with us watch this point with great interest. After a long and careful consideration in connection with your wise suggestion, Mr. Clemes and myself have determined the position of the new shaft to be in the west cross-cut at tunnel level. If you will consult the plan, and measure back 6 ft. from the end of the cross-cut, you will find the exact spot where the new shaft is started towards the 12. You will observe the cross-cut is entirely driven through lode matter, and the shaft started in the best part of the lode; at present it is productive of lead and copper ores. It will be observed the new shaft is in a fine position to facilitate the working of the San Juan: as soon as thought advisable we can put it through to surface. Should the workings at San Juan prove to be of a remunerative character, no time should be lost in pushing it through. The 12, north from Mina Grande, must be started at once to communicate with the above shaft.

July 30: The lode in the 12 north is unproductive; the ground is hard for driving, consists of felspathic porphyry. Whether it be a hard bar of ground of the above description or otherwise we hope to ascertain shortly. The end driving south of the 12 fm. winze is in a productive lode. The stope in the back of the 12 has fallen off in value. The lode in the shaft sinking below tunnel level, is fairly productive. It is probable we shall soon lose the lode in the shaft, as it appears to be inclining strongly to the west. In the San Juan, in sinking 4 ft. below the tunnel level, we holed into old workings. This excavation was made before this company's time, to what extent they worked here it is hard to say. The lode is very wide, and productive of docile ore with occasional stones of lead and black copper ores. The stope in the back is suspended until we finish the excavation in the bottom.

LA VIRGEN.—June 11: The stope above tunnel level is without change. The stope in the back of the 10 is falling off in value; the stope in the bottom of the 10 is just as usual.

July 2: Very fine black metal is still being taken from the stopes in the back of tunnel level. In the course of a few days we shall reach the green ore part of the stope, which of late has been productive of ore of a good ley. The stope in the bottom of the 10 is become poor, and will be stopped; this is the point where the Virgen lode, or branch, always gives out. Operations in the back of the 10 will now be commenced in other points to the south of our present back stope, which is at present poor.

July 16: The stope above tunnel level, which is now 13 fms. high, is still of a productive kind, yielding good black ore and a little green metal. One part of the stope in the back of the 10 is finished, the one directly under the stope above tunnel, the stope in the bottom of the 10 is also worked out. We are now filling up the old excavations, in order to work the back further south, where there is metal still standing in paying quantities.

July 30: The stopes above tunnel level are still yielding black ore of good quality, of late the lode has grown smaller than usual; it has not quite so nice an appearance as it had formerly. Stoping is again resumed in the back of the 10; at present the lode is smaller, but we expect a little further ahead to find it wider and better.

TIRITO.—June 11: There has nothing been done in the bottom of the 20 since last reported.

FIRST LODE.—June 11: A fair quantity of green metal has been taken from the stope in the back of tunnel during the past week. The cross-cut driving west to cut the lode to the north of the Tirito engine is progressing satisfactorily. We shall probably intersect the lode in three weeks from date.

July 2: The cross-cut from tunnel level is in communication with the lode, and a level started on its course. The lode is of a productive character at present. The stope in the back of tunnel is yielding good lumps of metal.

July 16: The end driving north has been passing through a very nice lode of docile ore. To-day, however, it is poor. Perhaps in a few feet more ahead the lode will be good again. Such is the nature of the "first lode." The stope above tunnel is much as usual.

July 30: A very sudden change has taken place in the end driving north; the lode has become valueless, and scarcely shows any signs of its existence. This lode (or rather branch from the main lode) has always been of a fickle nature. The stope in the back of tunnel level is productive of a little green ore.

July 2: The tribute department continues to yield green ore in limited quantities.

IMPROVED CUT-OFF MOTION.—The invention of Messrs. J. and G BENTLEY, of Bury, consists in so connecting the governor and the throttle valve that the governor does not act upon the throttle valve until the engine commences to run beyond its usual speed. In the fork of the governor rod, which partly encloses the clip, they form vertical slots, or with horizontal governors horizontal slots, in which the pins on the clip slide up and down; the pins do not act upon the rod until the engine attains too high a speed when the pins come against the top of the slots and raise one end of the governor rod and instantly shut off the steam. They use a spring, weight, or lever to open the throttle valve when the governor drops. They place the fulcrum of the governor rod nearer to the governor than to the throttle valve in order to make it act more rapidly. The governor rod may be connected to the governor and the slot made at the throttle valve end, or links or levers may be so arranged as to obtain the same result.

A petition for the winding-up of Clarke and Company (Limited) is to be heard on the 22nd inst.

INDUSTRIAL PROGRESS IN NEW SOUTH WALES.

[FROM OUR SYDNEY CORRESPONDENT.]

The official returns of shipments show that during the month ending June 30 there was shipped from Sydney, 511 tons 7 cwts. 12 lbs. of tin in ingots, and 563 tons 17 cwt. 12 lbs. of copper in ingots and cakes. The shipments also included cobalt ore, 32 tons; regulus, 14 tons; tin ore, 2 tons; spelter in ingots, 7 tons 6 cwt.; and pyrites, 7½ tons.

From the great interest taken in Great Britain in the progress of the Fitzroy Ironworks some reference to them will not be out of place. The works were started at Mittagong, a small town about 77 miles from Sydney on the Great Southern Railway, and promised to prove very successful, but after much struggling and great expense the proprietors failed to realise their expectations, the works closed, and for the present all operations connected with the manufacture of iron have ceased. Probably this has had a discouraging effect upon other persons of capital who may have looked upon Mittagong as a desirable place for profitable investment; and beyond some attempts to prove the quality of the coal deposits in the district, and in the event of the seams being found of a satisfactory description to work them, no efforts of any consequence appear to have been made with a view to establishing any other industry in the immediate vicinity of the town. Further away, however, some 15 miles or 18 miles, at a place called Joadja Creek, a kerosene shale mine has been opened, and mining for the shale and the manufacture of kerosene oil are being carried on in a manner apparently very profitable to the company who are the proprietors of the mine, and certainly very satisfactory to all who are in any way interested in the establishment of a successful industry in the colony. This mine and the manufacturing operations connected with it are together a remarkable instance of triumph over extraordinary difficulties, showing in a marked degree what can be brought about by a system of judicious expenditure, energy, tact, and carefulness generally. In these respects it contrasts very favourably with the more important industry near Mittagong, which many persons are disposed to think might, under better management than it received, have been brought to a condition very different from that in which the works are to be seen now. In the case of the Joadja industry, the undertaking was commenced and carried on upon a scale which gave the best chance of ultimate success, for the company appear to have gone steadily to work, doing little by little, increasing their plant and other facilities for the operations they intended just as they were required, and controlling their capital so that the expenditure should not exceed actual necessities and every pound sterling be represented by something of equal value. The Fitzroy Ironworks seem to have been less judiciously managed; another company appears to have adopted a system of expenditure which quickly ran through several thousands of pounds, that are now regarded as wasted, and in the end contributed largely, it is considered, to the stoppage and the closing of the works.

The manufacture of iron by the Fitzroy Ironworks Company does not seem to have failed solely because of the natural difficulties in the way of such an industry. Great obstacles had to be encountered, and in many and unforseen ways the progress of the industry was seriously interfered with; but if the opinion and the statements of people at Mittagong, who may be supposed to be well acquainted with the ironworks, are worth accepting, the manufacture of iron there would have had a very fair chance of success if the industry had been more discreetly conducted. Iron stone of great richness abounds in the locality, it is to be found in large quantities at the very gates of the works, and though coal and limestone are not so easily procurable, the necessity to get them from a distance is no great drawback to progress and profit. Capital was provided in plenty, and the works erected appeared to be just what was required, and were elaborate and costly. But any one walking round Mittagong now will have pointed out to him, in several places the remains of projects for the furtherance of the industry upon which thousands of pounds are said to have been spent quite uselessly; machinery which when procured must have been and still is very valuable, rusting and apparently going to ruin; and at the ironworks themselves so many evidences of decay and other hindrances to a recommencement of iron manufacture that, if it should be determined by any one to re-open the works, considerable expense would have to be incurred in repairs and, I was informed, in the alteration more or less of the plant so as to change and improve the method of operation. One of the features in the stoppage of the industry most to be regretted, perhaps, is the circumstance that a large proportion of the capital expended was English capital, for English capitatists are likely to be deterred from investing their money in colonial industries if they meet with any serious discouragements. It is many months since anything was done at the Fitzroy Ironworks, and at the present time the property appears to be locked up by reason, it is stated, of some proceedings at law, taken by a part of the shareholders for the protection of their interests. It is understood that this position of affairs would not interfere with the resumption of operations at the works, if it should be seen at any time that such a course was desirable, but the people of Mittagong complain that it interferes with the progress of the town, for as the company possesses a considerable quantity of land in the best part of the town, and will neither use nor sell it, the growth and prosperity of the place are very much retarded.

The spectacle presented by such an extensive and important collection of works as those at Mittagong going to decay is a very melancholy one, and this feeling is considerably heightened by an examination of the premises, for they seem to have been provided on a most liberal scale, with facilities for doing a large business. About the works are to be seen some of the results of the company's operations—bar-iron, tramway rails, and some of the remains of experiments at making double-headed rails—sure signs that the industry must have advanced considerably beyond the preliminary stages of its career before it came to a standstill. Whether the difficulties in the way of its success were greater than the industry at Eskbank has met with is a question not very easy to answer; but the Fitzroy Ironworks Company were the first to commence the manufacture of iron, and had to struggle with obstacles long before the Esbank Ironworks Company was formed; and moreover, the younger company have had the benefit of the services of a gentleman well acquainted with the experience gained in the manufacture of iron at Mittagong, for he was employed there. Hope is still entertained that sufficient inducement will be found to bring about another trial of the works at Mittagong. At the time of my visit a gentleman connected with ironworks in England, and who came to the colony in charge of some machinery exhibited at the recent International Exhibition, was there making some experiments in the expectation of being able to smelt iron by a very much simpler and cheaper process than that before adopted, and he felt convinced that he should be successful. His process was a secret one, and therefore little or no information respecting it was obtainable, but its importance lay in the circumstance that if he could produce iron in the manner he believed he could operations at the works would, in all probability, be quickly resumed by the company.

The Joadja Creek industry is carried on by the Australian Kerosene Oil and Mineral Company, comprising half a dozen Sydney merchants, and was commenced about three years ago. The account given of its origin is as peculiar as is the locality where the industry exists. The absolute truth of the story cannot be guaranteed, but it has about it an air of probability, and it is very similar to accounts that have been given of the circumstances which have led to the working of minerals in other places. The situation of the mine and the kerosene works is romantic in the extreme. In the centre of a circle of mountains, where the extent of the valley or basin in any direction would scarcely exceed the range of a rifle shot, and the approaches to it are almost inaccessible, the huts of the mining village can be seen like toys; a little further off the works erected by the company for the manufacture of kerosene oil; and high above them, on the mountain side, the mine from which the shale is taken. At night, standing on the ridge immediately above the village, and between the place and Mittagong, the valley is a tremendous abyss of darkness, with nothing to relieve the intensity of the gloom but the glimmer of a few window or fire-lights, and now and then a voice borne upwards unintelligibly upon the wind. The moon tints the depth with a mellow and misty radiance, and the early morning or the afternoon sun touches many a tree and hillside with a rich warm colour. But in midday the place can best be seen in its sober, active, earnest, industrial importance. Then the charms of natural beauties are forgotten in the interest excited by the signs of labour and the evidences of busy and profitable industry—by the sound of the shale falling down the shoots from the mine, the rising steam from boilers, and smoke from furnaces, the passing to and fro of men intent upon various kinds of employment, and by the ascending and descending of loaded wagons upon a tramway from the valley to the summit of the mountain nearest Mittagong. Such a picture of enterprise, activity, and progress it would not be easy to find anywhere else. About three years ago operations at the mine commenced; about two years ago the first of the plant arrived from England, and the laying of a railway, which now reaches to within less than three miles of Mittagong, was begun; twelve months ago the first kerosene oil was sent to market, and from that time to this the industry has been progressing every day.

The shale seams in the company's property are very curiously situated. They are believed to be the same seams as those found and worked in the Hartley district, but they are considerably thinner. The Joadja Mine shows first a freestone roof, next 8 in. of soft coal, which is used as a good gas coal, and for other purposes; then the top shale, which is from 9 to 11 in. in thickness, and is capable of yielding 100 gallons of crude oil to the ton; next the bottom shale, ranging in thickness from 12 to 16 in. for export and for gas purposes; and then 16 in. of hard inferior coal. Both coal and shale are utilised to the fullest extent. The best of the shale goes to market, while the rest is retorted, and its oily properties turned into kerosene, and the coal both goes to market and is used at the works. Such a thing as working a seam of coal no thicker than 8 in. is somewhat of a novelty in mining, but in an industry like that at Joadja Creek nothing appears to be wasted, and perhaps that is the secret of its success. The manager is a shrewd determined-looking Scotchman, and he has everything upon a substantial basis. He claims for Scotland the credit of originating the shale and oil industry, in 1851, at a place called Bathgate, where the shale existed under the name of the boghead mineral, and the oil was called parafine. The much richer shale in this colony he calls the Australian boghead mineral; and in his attachment to the Scottish industry and the time when he himself was engaged in it, he went home, not very long ago, and brought out a number of Scotch people to work the industry here. And very Scotch the place is in consequence. The language is the broadest and sometimes the most incomprehensible, the dress in some cases the quaintest, and the habits peculiar. The works erected in the valley are very extensive and complete, and the manufacture of the kerosene oil seems to have been carried to a high state of perfection. The retorts number 32, and they shortly will be increased to double that number, for the foundations required for the extra ones are being constructed, and the additional retorts themselves are on their way from England. Refining the oil, putting it into tins, and packing it in cases, are all done at the works, appliances having been provided for almost every operation connected with the industry, and as many as from 400 to 500 cases of oil are produced in the week. Even the tins and the cases are made on the premises, and the oil is carefully tested before being sent away.

The daily output of shale and coal from the mine at the present time is from 40 to 60 tons of the former, and 25 tons of the latter; and if the company's railway were completed, so that it might be connected with the Great Southern Railway, at Mittagong, the output might be considerably increased. At present the company's railway terminates within 2½ or 3 miles of the main line, and from that point the shale, coal, and cases of oil, after having been drawn from the locality of the works by means of trucks, and a small locomotive, are conveyed by horse wagons along the road to the Mittagong Railway Station. But the company's railway is being as quick as possible extended the necessary length, and a new and much stronger locomotive is being procured from England. To get the loaded trucks from the valley to the top of the mountain, where the railway in the direction of Mittagong commences, a tramway or railway, similar to that at Hartley Vale, has been constructed, and owing to the great height and steepness of the mountain the ascent and descent of the trucks are something terrific. It is estimated that there are at least from two millions to three millions of tons of shale on those portions of the company's property which have been tested, and it may be that there is a considerable quantity in places not yet examined. The shale and coal are cast from the mouth of the mine down narrow shoots to the valley, and are then put into trucks and sent away—the shale going from Sydney to the United States, to England, and even to the Continent of Europe, for gas purposes. The total population of Joada Creek is about 300. Of these the number of miners employed is about 60, and 40 or 50 other men are at work one way or another. The miners are paid at the rate of 3s. 9d. a ton, a sum considerably less than that given at Hartley; but the work at Joadja is said to be easier, and the men make good wages. The houses or huts the people live in are chiefly owned by the company, who had them erected for the use of the workmen, and charge the men a rent of from 1s. to 2s. a week, according to the class of house that is occupied; and the company have also opened a general store, and butcher's and baker's shops, from which to supply the people with provisions. There is a public school and a post-office; and altogether the little settlement and its thriving industry are something very novel and very interesting.

THE INDUSTRIAL EXHIBITION AT MANCHESTER.

The exhibition in the large agricultural hall at the Pomona Gardens, Manchester, the formal opening of which took place last week, is now getting into fair working order, but is not yet thoroughly complete, as many of the exhibits had not even this week been sent in. The original intention of the promoters was to render the exhibition as thoroughly comprehensive as possible, and sections were arranged embracing almost every branch of industry, including machinery and motive-power of all descriptions, textile and other fabrics, clothing, &c., mineral products and manufactures, carriages, saddlery, fire-arms, &c., appliances for saving life and property, domestic and sanitary appliances, food, education, and art. That they have not been able to carry out the whole of this comprehensive programme is scarcely surprising, but in some of the sections, chiefly that devoted to machinery and in gas apparatus, for excellence in which silver medals have been offered for competition by the Gas Committee of the Manchester Corporation, there is a numerous and creditable display of exhibits. Of course in the absense of many of the exhibits it is impossible to deal with the exhibition completely in the present notice, nor is it necessary to enter into a description of a large number of the articles which are already familiar objects to those who have visited recent similar exhibitions, and we must confine ourselves to a few of the novelties which here and there presented themselves in the section devoted to machinery.

This section occupies the chief portion of the building, and the motive power is supplied to the machinery by a steam-engine and boiler exhibited by Messrs. Deakin, Parker, and Co., engineers, Salford, about which there are one or two features deserving of notice. In the first place the engine is furnished with a patent automatic governor, which replaces the ordinary revolving governor and works the steam expansively instead of throtling it. This governor may be briefly described as consisting of two weights and a spring placed inside of a drum keyed on to the shaft, and so arranged that when the speed of the drum increases the action of the weights, counteracted by the operation of the spring, regulates the admission of the steam. The slide valves are also balanced to prevent excessive friction on the facings, and the driving power of the engine is conveyed to the shaft by one of the Oldfield leather link beltings, which appears to work very well, and which it may simply be stated is, in the place of the ordinary solid leather band, constructed of small leather links 1½ in. long, fastened together with steel pins. For the line shaft in the exhibition Messrs. Richards and Atkinson's new hanger has been supplied, and this consists of a ball and socket joint, which always adjusts itself to the shaft, whilst the shafting itself is the Kikstall Forge patent rolled shafting.

Fuel economisers of various descriptions are amongst the most prominent exhibits, and these include a new patent which has been brought out this year by Mr. Andrew Bell, one of the well-known makers. The general construction of economisers is already pretty well known to the public, but as Bell's new patent is the first of the kind that has yet been exhibited a short description may be of interest. The chief feature of the economiser, which is termed the patent "Eclipse," is a new arrangement of the pipes, which instead of being placed in straight lines cross one another at right angles from right to left, thus more completely intercepting the heat as it passes through the economiser without interfering with the draught. A further advantage claimed is that the pipes having circular ends a rapid circulation of the water is ensured, whilst the scrapers are so hung that the outside of the pipes is kept thoroughly clean. The whole apparatus is self-contained, being built on its own framework, and not made to stand on any brickwork whatever, whilst the arrangement of the pipes enables them to be readily and easily removed or replaced in cases of accident or repairs. In connection with the economiser Mr. Bell exhibits a steam-boiler filter, the use of which, it is claimed, will avoid much of the internal cleansing of boilers, besides increasing the generating power and adding to their durability.

Mr. Geo. Preston, of Manchester, also exhibits an economiser, the chief feature of novelty in which is a new patent scraper, having a different action to others which have yet been introduced. The scraper is spiral in form, with cutting edges at top and bottom, and hung in three separate sections, so arranged that they not only cover completely the whole surface, but the cutting edges are brought close on to the pipe. The gearing is also new, and simple in its action, being specially arranged to secure the reverse motion of the scrapers at the right moment. As in nearly every other respect, advantages are claimed for the jointing of the pipes, the top boxes being so arranged that the entire body of any pipe can be drawn out without displacing the others. One of these economisers we may add is at present being fitted up on a large scale for the new works of Sir Joseph Whitworth and Co., of Manchester.—Mr. Joseph Twibill, of Manchester, is also an exhibitor of economisers and steam-boiler filters, but these do not present any new features as compared with those by the same maker, which have been seen at recent exhibitions. In connection with this description of apparatus may be mentioned a new tubular water and air-heater, by which the exhaust steam for heating has a straight course through the nozzle and lower chamber, thus preventing back pressure on the piston of the engine, whilst the tubes are so arranged that the steam is kept entirely from the feed water.

Messrs. W. Kenyon Knapp and Co., of Manchester, occupy a considerable space with their exhibits on behalf of various firms. Amongst the most noticeable were a number of excellent steel castings manufactured by the Attwood patent, and Messrs. Wm. Milburn and Sons' patent centring chuck, by which pipes, pillars, cylinders, and other hollow bodies may be faced at both ends at once. The chuck is bolted by a flange to the face plate on the spindle of the fast head stock, and a similarly constructed chuck is mounted on the centre of the following head stock. Projecting from the back portion of the chuck, and formed with three curved inclines, is a ram piece, and above the inclines are three grooves. Three gripping pieces rest upon the curved inclines, and small pins projecting from the inner edge of each gripper enter the grooves. The front side of the chuck is covered in by a cap, and the gripper or dogs slide in slots formed in the cap, and project somewhat above the periphery of the chuck. When in operation the pipe is brought into position, so that the two chucks enter the ends, whereupon the back portion of the chuck on the fast head stock is turned, and the dogs are thrust outwards until they bear forcibly against the interior of the pipe, which will then revolve and turn the cap on the chuck at the other end, and the corresponding dogs are thrust out, by which means the pipe is gripped and centred at both ends.

A new mechanical press is exhibited in working model by Mr. M. Stonehouse, of South Stockton. The chief features of the machine, the model of which has been expressly constructed for this exhibition, are that the stroke may be continued for any length, and an equal pressure is maintained throughout, so that whatever the depth of the material to be operated upon it is successfully compressed, and there is no need to insert packings as in other presses. The construction of the machine may be described as follows:—So far as the head, block, base and columns go the press differs little from the regular type. But there is used a large central screw, 12 in. in diameter, attached to a platten. Two pairs of toggle arms are attached to the head at one end, and to a follower, bored to slide on the large barrel, at the other ends, and attached in the centre to loose hinges, which are also on eccentric straps. The toggle arms have a horizontal oscillating motion of 2½ in, given by the eccentrics which are operated by right and left hand worm wheels. This gives to the follower, to which the lower ends of the arms are attached, a vertical oscillatory motion of half an inch. Underneath the head block and also underneath the follower are toothed nut wheels, and when these are left free to move by the action of the arms they have a sixth of a revolution given to them by wheel sectors acting upon them alternately, thus giving an intermittent motion, and to get certainty of action this gear is so made that when the sectors are out of gear the nut wheels are backed in position until they have another sixth of a turn given to them. By these means a step by step motion is obtained, and the greatest power that can be got by forcing a pair of arms already nearly in line into a straight line. The model press is one-quarter size, and will press five tons. A working press has not yet been constructed, but it is estimated that the power of a full-sized press will be 225 tons.

Somewhat of a mechanical curiosity in the shape of a machine for boring square holes by rotary motion is exhibited by Mr. Jenkins Hall, of London, who offers his patent for sale. The machine attracts a good deal of interest, owing to its novelty, and square holes flat at the bottom are readily bored into or through various kinds of metals. So far as could be seen the operation of the machine would seem to be very simple. A three cornered drill is used, with loose action at the top, and the cutting parts passing through a case-hardened die—the die hole being of the exact size and form of the hole to be cut out in the metal underneath—the loose action of the drill enables it to follow the sides of the die, the cutting edges giving a turn along each side of the apperture, and thus an exactly similar hole is cut out in the metal underneath. On a small scale the machine might no doubt be very useful, but it is questionable whether it would be found adaptable to heavy engineering work.

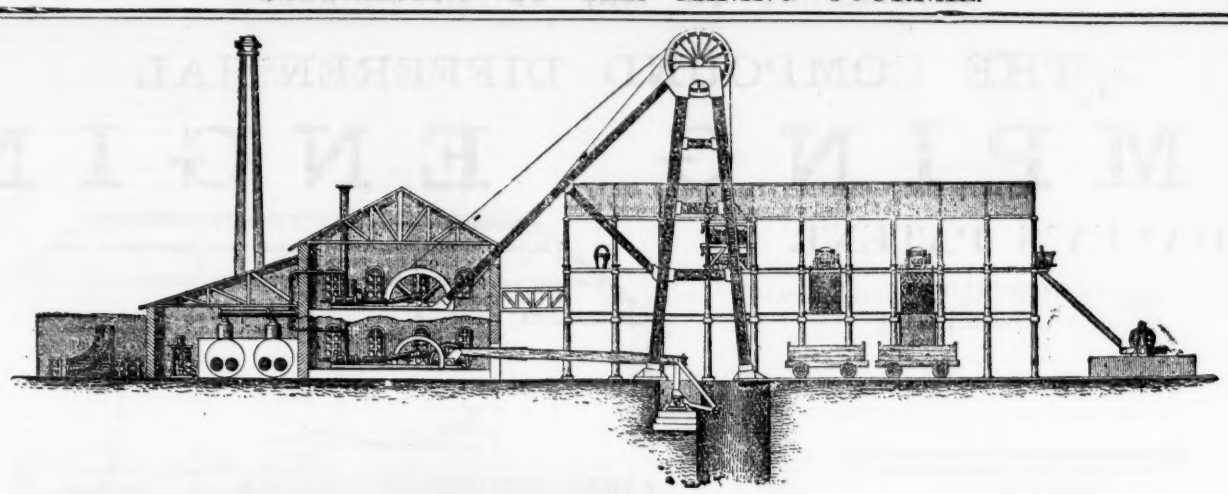
Messrs. Allott and Enticknap, of Manchester, exhibit De Bergue's patent rail lifter, which has been designed as a substitute for the ordinary lever bar. The lifter may be described as a sort of steel wedge, containing in the centre a loose arm attached by a bolt to the narrowest end, and connected with a screw and spanner at the other extremity of the apparatus, by which the loose arm is raised or lowered as desired. In operation the thin end of the lifter is simply passed under the rail, and the spanner turned until the rail is lifted to the necessary level, an operation which can be performed by one man in a couple of minutes. A considerable number of these lifters are already in use on various railways, and they have been found to effect a great saving of time and labour.

The Exhibition contains a number of other useful inventions, but any further notice must be deferred until the arrangement of the exhibits is complete.

ENGINEERING SCHOLARSHIPS AT UNIVERSITY COLLEGE, LONDON.—The advantage to professional engineers of sound scientific training is now everywhere recognised, and the encouragement offered in the various colleges and universities of the country to those who seek it annually increases. This year an important addition has been made to the encouragement to technical study offered at University College, London, by the establishment of the Gilchrist Engineering scholarships, which are the gift of the Gilchrist trustees, and which are offered this year for the first time in connection with the Engineering Department of the College. These scholarships are not only open but the competition is distinctly limited to those under 18 years of age who have not previously been students of the college, and at the commencement of the coming session two entrance scholarships, each of the value of 35*l.* per annum and tenable for two years, will be competed for. The examination will commence on Sept. 28, and candidates are required to give on the Thursday previous written notice of their intention to compete. The object in view has evidently been to make the gaining of it supply an evidence that the Gilchrist Engineering Scholar has really made good progress in the study of subjects calculated to prove useful to him as an engineer, for the subjects of the entrance examination are:—Mathematics, mechanics, mechanical drawing, essay on one of three given subjects connected with mechanics or engineering, French or German, and the use of tools—either carpenter's tools, or the lathe (wood or metal), or the file; and it is moreover provided that every candidate must declare in writing his *bona fide* intention of taking at least the two first years of one of the Engineering courses as set forth in the prospectus (which with the detailed regulations as to scholarships, &c., can be obtained by sending a stamped and addressed envelope to "The Secretary, University College, London"), and the payment for the second year will be contingent on his entering at the commencement of that session the classes comprised in that course, and also upon his having presented himself at the class examinations of the preceding session and obtained not less than three certificates in these examinations. A Senior Scholarship of the value of 80*l.*, payable half when awarded and the balance in the succeeding June, will (during the pleasure of the Gilchrist Trustees, as in the former case) be awarded at the close of each session from 1881-2 inclusive, the condition being that candidates shall have attended during all the preceding session the College classes in applied mathematics, practical physics, junior engineering, engineering, drawing and geology. That such a course of study will be of enormous utility to practical men cannot be doubted, so that it may fairly be hoped that the offering of the scholarships will have the effect of encouraging the more energetic study of the subjects with which they are connected.

CHROME.—New Zealand is again about to place large quantities of chrome on the market, the greater portion of which will, no doubt, come to the United Kingdom.

HOLLOWAY'S OINTMENT AND PILLS—EVER USEFUL.—The afflicted by illness should look their diseases fully in the face, and at once seek a remedy for them. A short search will convince the most sceptical that these noble medicaments have afforded ease, comfort, and oftentimes complete recovery, to the most tortured sufferers. The ointment will cure all descriptions of sores, wounds, bad legs, sprains, eruptions, erysipelas, rheumatism, gout, and skin affections. The pills never fail in correcting and strengthening the stomach, and in restoring a deranged liver to a wholesome condition, in rousing torpid kidneys to increase their secretion, and in re-establishing the natural healthy activity of the bowels. Holloway's are the remedies for complaints of all classes of society.



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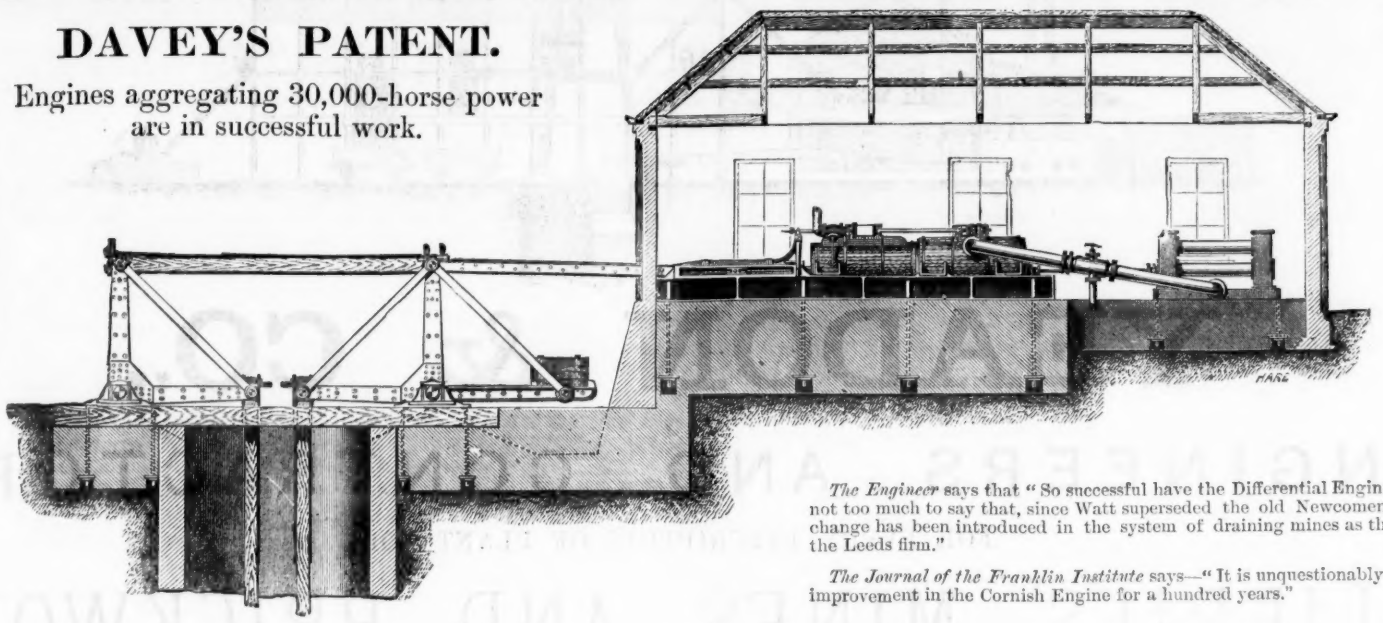

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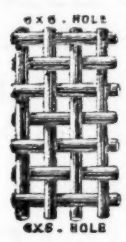

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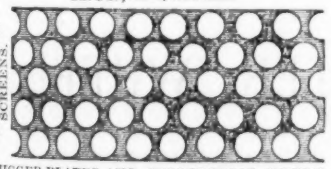

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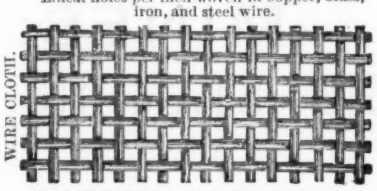

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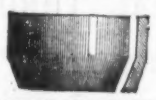

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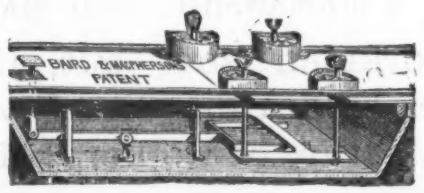

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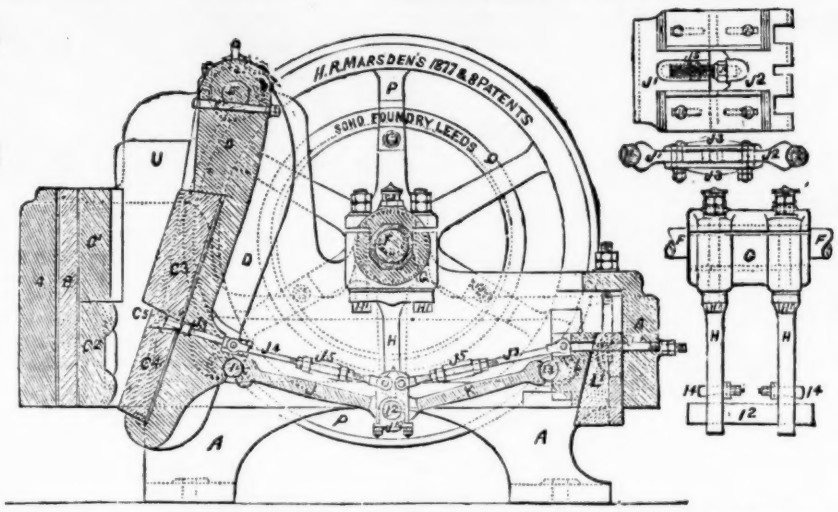

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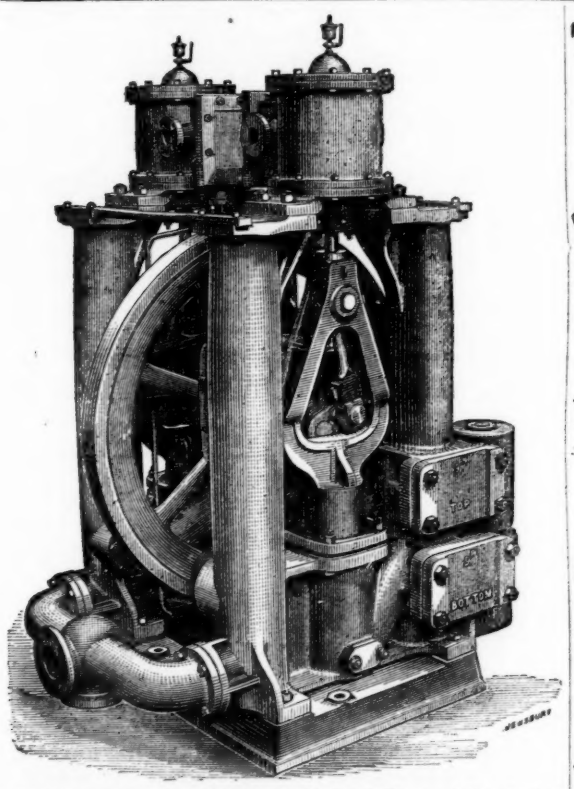

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Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, where all communications are requested to be addressed.—*September 11, 1880.*